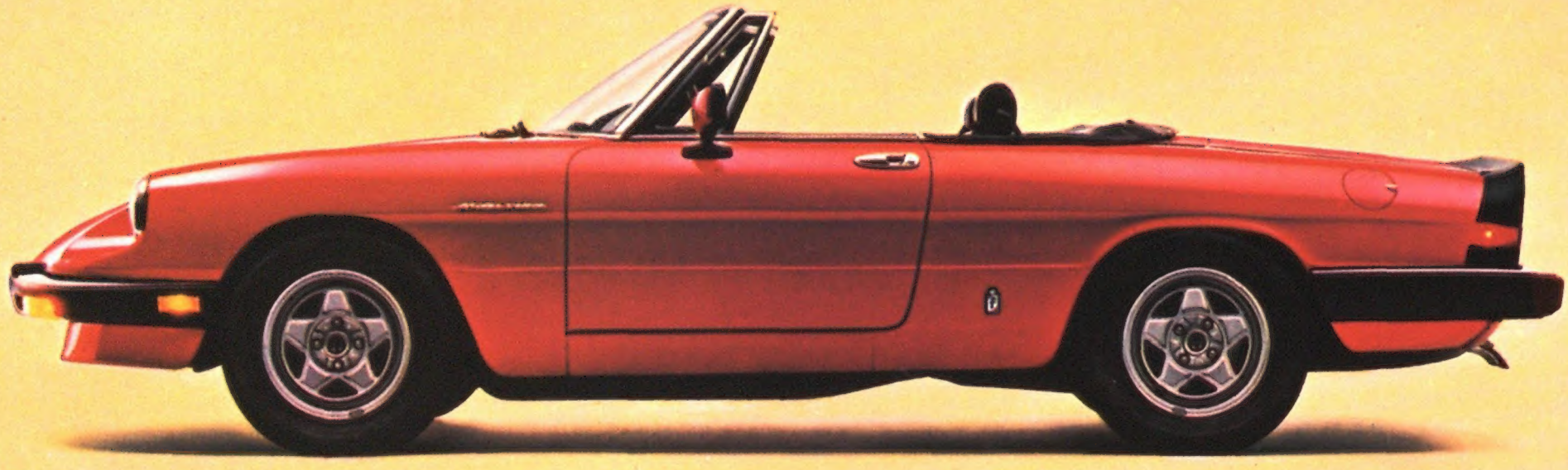
Smithsonian

August 1985

The Garment District

Here, the fall showing—biggest deal in the business of fashion (p. 30)



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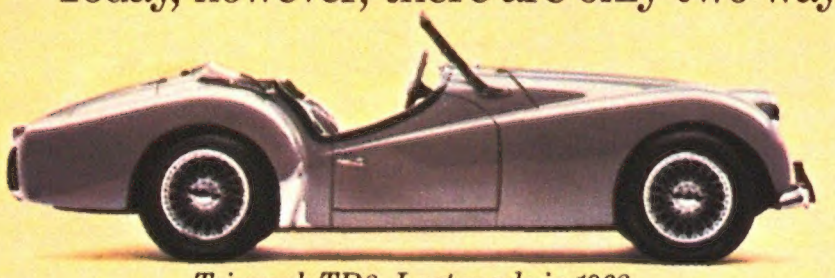

Triumph TR3. Last made in 1963.

Austin Healey MK.III 3000. Last made in 1968.

Jaguar E-Type. Last made in 1975.

In every sense, the Alfa Romeo Spider Veloce is a vintage sports car. Its timeless Pininfarina design has made it a modern-day classic. And the distinctive, throaty sound of its 2.0 litre twin cam engine is a stirring reminder that you don't buy one for looks alone.

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August 1985

Smithsonian

Volume 16, Number 5

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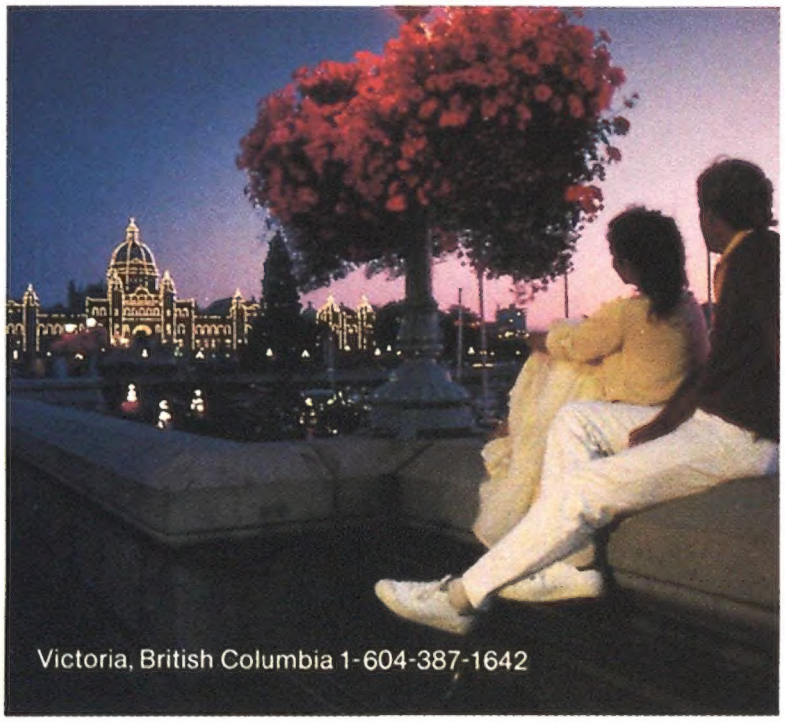

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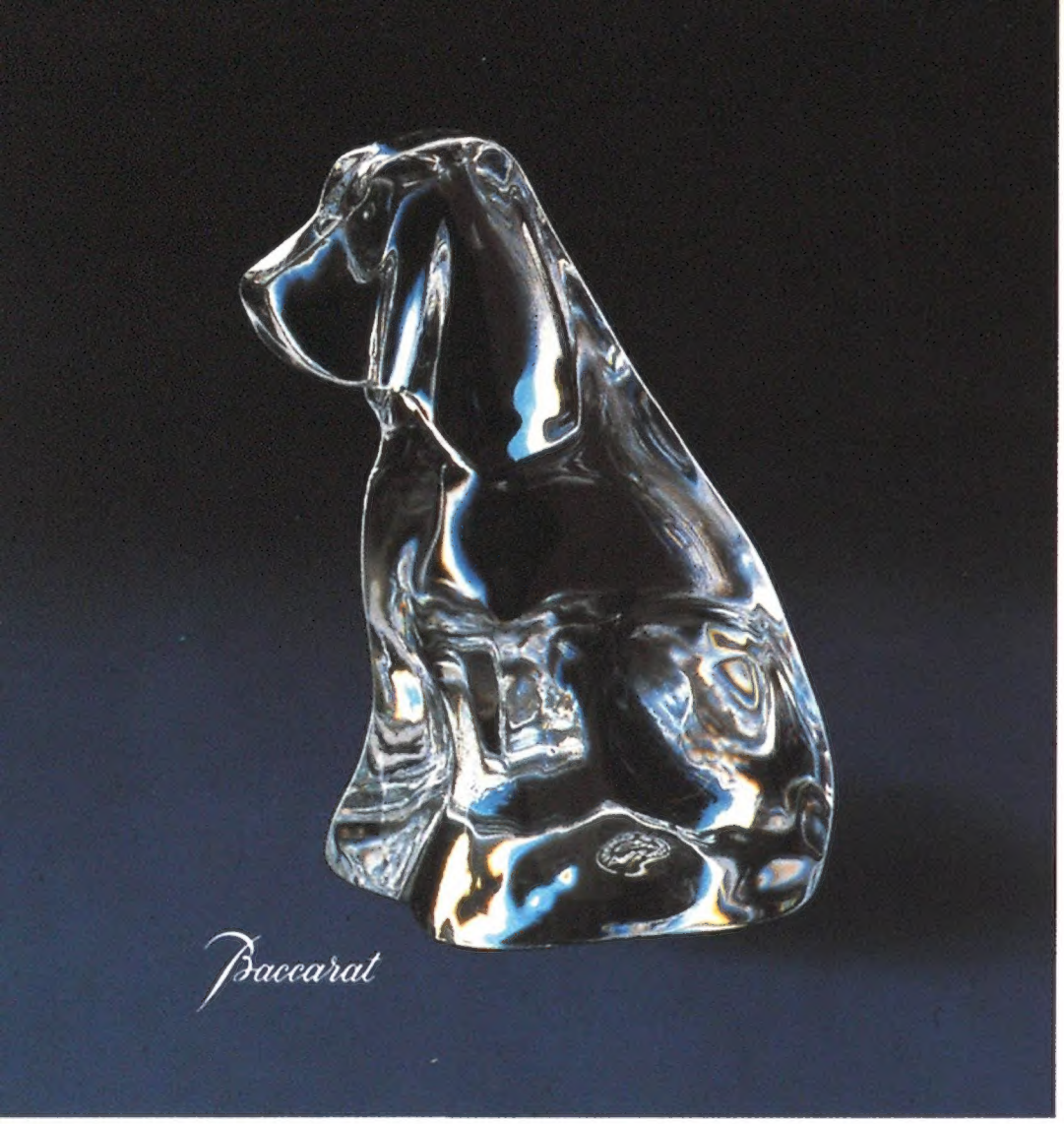

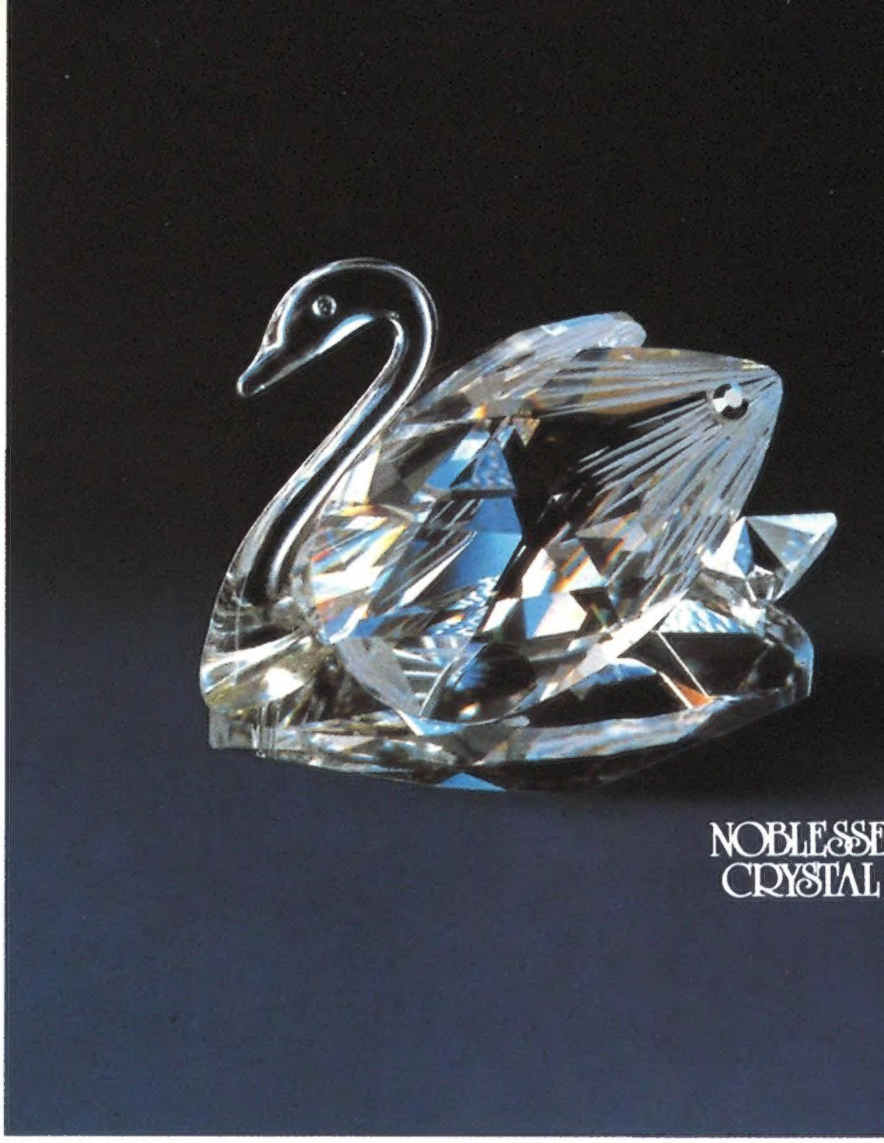

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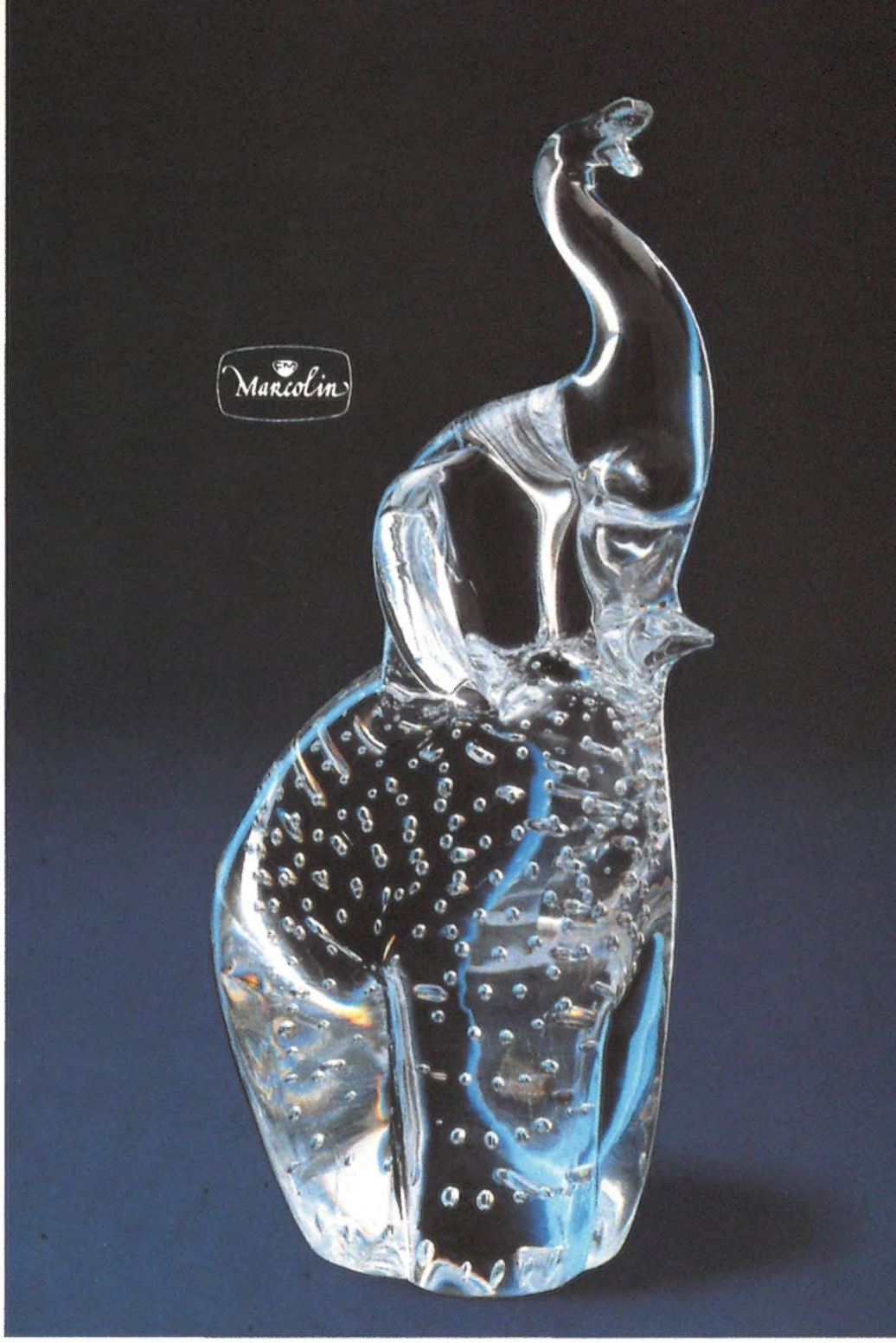

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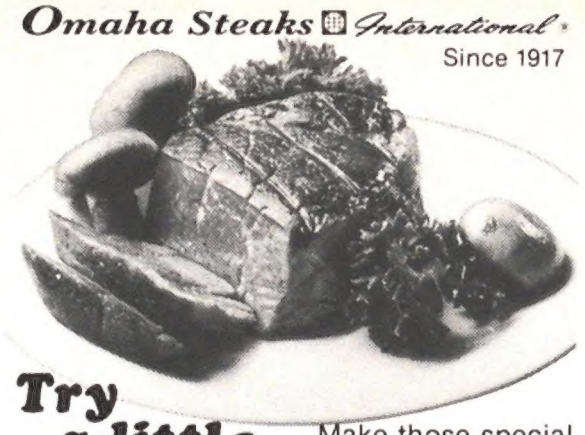

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Secretary Adams' comments

Smithsonian horizons

In Japan our Lecture and Seminar Program has prepared the way for promising joint undertakings

The Smithsonian National Associates Lecture and Seminar Program recently went to Tokyo for its first appearance outside the United States. Providing a popular and flexible format for the dissemination of firsthand knowledge by researchers in the fields of science, art and history, the program for some years has been visiting cities large and small from Alaska to Florida and from Maine to Hawaii. Close cooperation with museums and other local institutions is always stressed. Working together, we are able to broaden the impact of one another's programs.

Why Tokyo? At one level, it can reasonably be argued that our partnership with Japan is the most important such relationship that this country has. If it is currently under some strain as a result of problems arising from our national deficit and the balance of trade, this partnership is still the cornerstone for the prosperity and security of the vast world region centering on the Pacific Ocean.

At the same time, communication between the two countries is much less effective than it should be. Stereotypes abound, and the difficulties of particular products or industries are misrepresented as support for sweepingly general solutions such as higher tariffs. While not being directly involved in any of our formal diplomatic relationships, the Smithsonian undoubtedly has something to offer toward an improvement of communication among peoples. If we can help, we should.

It is disconcerting to realize how narrowly based our thinking about Japan usually is. Without understanding how they have become so effective so rapidly, most of us tend to view the Japanese principally as economic and technological competitors.

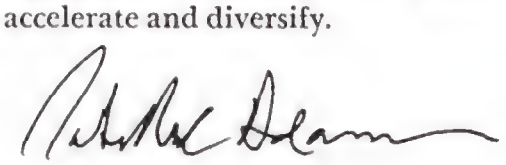
Scientific and cultural communication usually is carried on in English, if it is carried on at all, with relatively few of our students doing graduate studies there. Joint research projects are rare, as are exchanges of museum materials. American enrollments in Western European language courses tend to be 20 to 30 times higher than those in Japanese. And modern Japanese literature is only infrequently translated into English. All these grave deficiencies lie closer to the domain of the Smithsonian than economic competition, and they deserve our attention in their own right.

The contribution of the Japanese in my own field of ancient Near Eastern studies has grown almost as rapidly as their achievements in engineering. It was accordingly a pleasure for me to visit at length with Prince Mikasa, whose Society for Near Eastern Studies in Japan has played a leading role in stimulating a well-conceived, impressively sustained effort. This movement into a position approaching world leadership in some subject areas belies the argument that the Japanese have targeted investments into areas with commercial potential.

Other colleagues in the sciences who joined me in the Program, including volcanologist Richard Fiske, invertebrate zoologist Clyde Roper and physical anthropologist Douglas Ubelaker, came away with the same impression. Fiske and Roper were the only ones among our group of ten lecturers, I might note, who had previously done actual research in Japan.

We are much indebted to the MYC Cultural Exchange Institute and to its chairman, Masaji Yasunaga, for generously sponsoring our visit. As you may have inferred, it was much too brief! Discussions were only begun about a number of possible joint undertakings, ranging from research projects to return visits, exchange fellowships and more traveling exhibits.

With these new friends and acquaintances, the number of leads into additional cultural spheres has increased manyfold. Even more gratifying were the editorials in Japanese newspapers suggesting that the institutional innovation represented by the Smithsonian itself was one that Japan could consider taking up. Clearly, what has been initiated is a long-range program of contacts that should both accelerate and diversify.



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Letters to the Editor

Flying squirrels

Dear Sir: Your June article recalled my high school days in 1940-41, trapping flying squirrels live in Orange and Newton Counties of southeast Texas. They were great. With a string attached to one leg, they could be carried into school in one's pocket, where they nestled quite happily. Brought out at propitious moments during the day—when Teacher wasn't looking—they would fly around, to vast amusement of the class. The real challenge was to get them back into the pocket before Teach caught on.

J. R. Thomen
Greenville, Delaware

Dear Sir: In my seminary days at Woodstock College in Maryland, I had a dormer room in the attic. One September evening I discovered that my closet harbored a flying squirrel. It was a bit frightened but also somewhat friendly.

I found a cage, and it didn't seem to mind confinement. The remarkable thing about its habits was that every morning, after a rather noisy night of chomping, there was a neat pile of discarded shells in one corner of the cage, an equally neat pile of droppings in another.

I let my flying squirrel go in the spring. Lo and behold, the next September it returned and spent another winter!

Joseph D. Ciparick
New York City

Sir John Franklin

Dear Sir: In 1969, with Prof. C. C. Loomis of Dartmouth, I disinterred the body of Charles Francis Hall, an American explorer who had died under mysterious

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circumstances in 1871 on the coast of Greenland. Hall had contributed significantly to the discovery of Franklin's end, then tried to reach the North Pole.

Our autopsy on Hall showed that he had died of arsenic poisoning, either inadvertently self-administered or given him by the ship's doctor, perhaps to halt any possibility of further attempts for the Pole the next spring.
Franklin K. Paddock, M.D.
Pittsfield, Massachusetts

Dear Sir: Referring to Franklin's first expedition, it is not true that his two 35½-foot freight canoes "had to be abandoned at Bathurst Inlet." They were remade into two smaller, portable craft just below Wilberforce Falls on the Hood River, 30 miles upstream from Bathurst Inlet.
John W. Lentz
Bethesda, Maryland

Sunlight and your health

Dear Sir: Your article highlights some important medical applications of light, with only a passing mention that light may also be damaging. Prolonged or stressful light exposure can wear upon the lens and retina within the eye and contribute to their aging. Intense ultraviolet would seriously injure the eye unless the subject wore shields. Phototherapy is an important medical tool, but like other types of therapy, has its risks.
Michael F. Marmor, M.D.
Chief, Division of Opthalmology
Stanford University School of Medicine

Monterey Bay Aquarium

Dear Sir: Your article overlooked the part played by Hopkins Marine Station, established by Stanford University in 1891, in founding the aquarium.
Lillian Harris Gilchrist
Huntington Beach, California
Hopkins Station, which is next door to the Aquarium, had a seminal role in its establishment. Four marine biologists associated with Hopkins were instrumental in its planning, and one of them, Dr. Steven Webster, is now at the Aquarium as director of Education. Ed.

Boulderers and builderers

Dear Sir: You imply that this weird aberration is much newer than it is. By the 1920s, if not before, climbers' hotels in the Lake District and climbers' rooms in Cambridge, at least, had numerous traverses of doorways and mantelpieces that were *de rigeur*. *The Night Climbers of Cambridge* was not a Dead Sea Scroll of buildering, but the outgrowth of a long tradition. The earliest text I know is *Wall and Roof Climbing* (Eton, 1905), by future alpinist Geoffrey Young, one of our guiding lights when we experimented with new routes on Cambridge buildings. The pseudo-Gothic of Yale, when I was a graduate student, also had its points.
William B. Willcox
New Haven, Connecticut

Dear Sir: John Skow's article stressed skill and agility as most important. A four-season teacher of bouldering, I differ. It is imperative beginners be educated from day one in the mechanics of the sport.

Enjoy it, but do it safely so you can return to climb again. Learn the bouldering philosophy, belay and protection placement techniques, and develop from your own personal skill level.
Dan Walsh
Sterling, Virginia

Alexandria library

Dear Sir: Professor Casson passed over a sidelight of the Pergamum library when it was in Antony's sphere of command. The library was founded by Eumenes II and in his reign parchment, far superior to papyrus, was introduced.
Paul L. Smith
Pasadena, California

Dear Sir: Laurels to Lionel Casson. One fact, however, needs correction: in the fifth century B.C. Pānini had written his grammar of Sanskrit, a work that is still in active use today in the study of that language. This antedated that of Dionysius of Thrace of the second century B.C.
Robert A. Barrett
Yaphank, New York
Mr. Barrett is correct. Ed.

Queen of the fleas

Dear Sir: I was shocked to see the display of an elephant's foot in the picture of Miriam Rothschild. It is beyond me how she can say she always loved animals, then have in the same room with her a part of a mutilated animal.
Bernie Maengen
Eugene, Oregon

Dear Sir: When I looked at the photograph on page 142 captioned "Edwardian equipage," I noticed that the left lead animal is a horse and not a zebra.

Zebras are unreliable animals because when startled they go berserk. Was this even-tempered horse teamed with the zebras in order to set a good example for them?
Patricia Sweeney
Blacksburg, Virginia
Quite so. Miriam Rothschild says that zebras are too unruly to stand still and pose for photographs. For the picture, a horse was introduced to calm them. But her Uncle Walter was accustomed to driving his team of four zebras, which he had trained, on outings. Ed.

Mall

Dear Sir: To the Italian stone carvers who are enriching the National Cathedral with beauty—*Bravo e complimenti!* I see no reason why their carvings should not be signed, so the men and their descendants could receive proper credit.
Joan Mastropaul
Syracuse, New York

Dear Sir: You mention the carvers foreseeing "the end of their craft." Currently, in New York City, English carvers who were brought here to work on the Cathedral Church of St. John the Divine have apprentices from the immediate neighborhood—Harlem.
Phyllis Meeker
Collinsville, Connecticut

Cerro de la Neblina

Dear Sir: Your article stirred vivid memories of my participation as a member of the first party of biologists to visit the "Mountain of the Mist" in February 1984. Six colleagues and I from the American Museum of Natural History, as well as scientists from many other institutions in North America and Venezuela, were the first to inhabit the utterly remote base camp at Neblina. At that stage it was less like the "Neblina Hilton" than a tiny outpost of energetic scientists clinging to the base of the ancient, fog-shrouded massif rising from a swamp-forest that extends to the misty horizons.
Jerome G. Rozen jr.
Deputy Director for Research
American Museum of Natural History
New York

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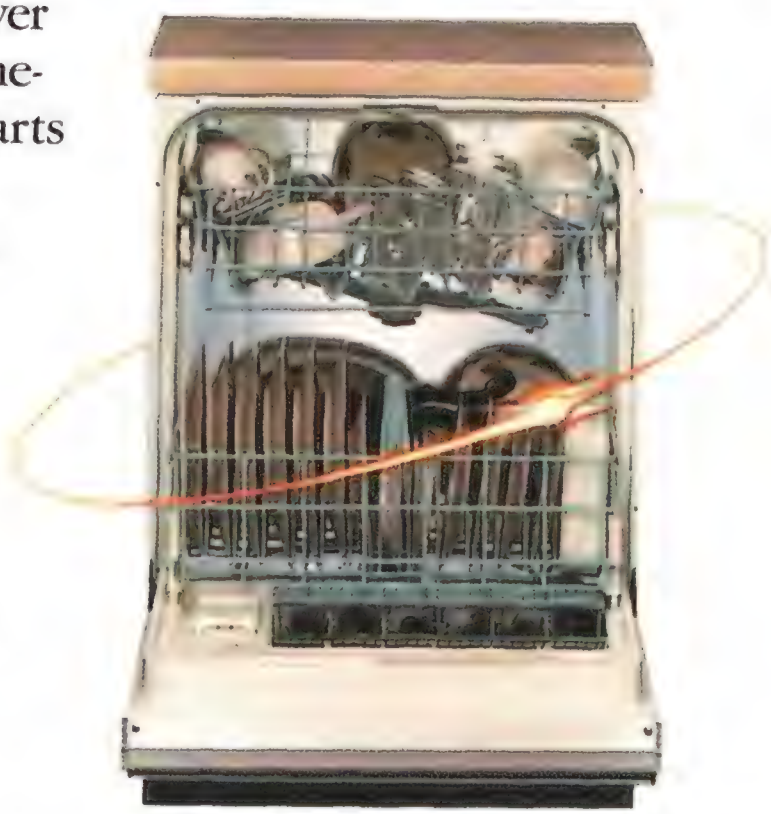

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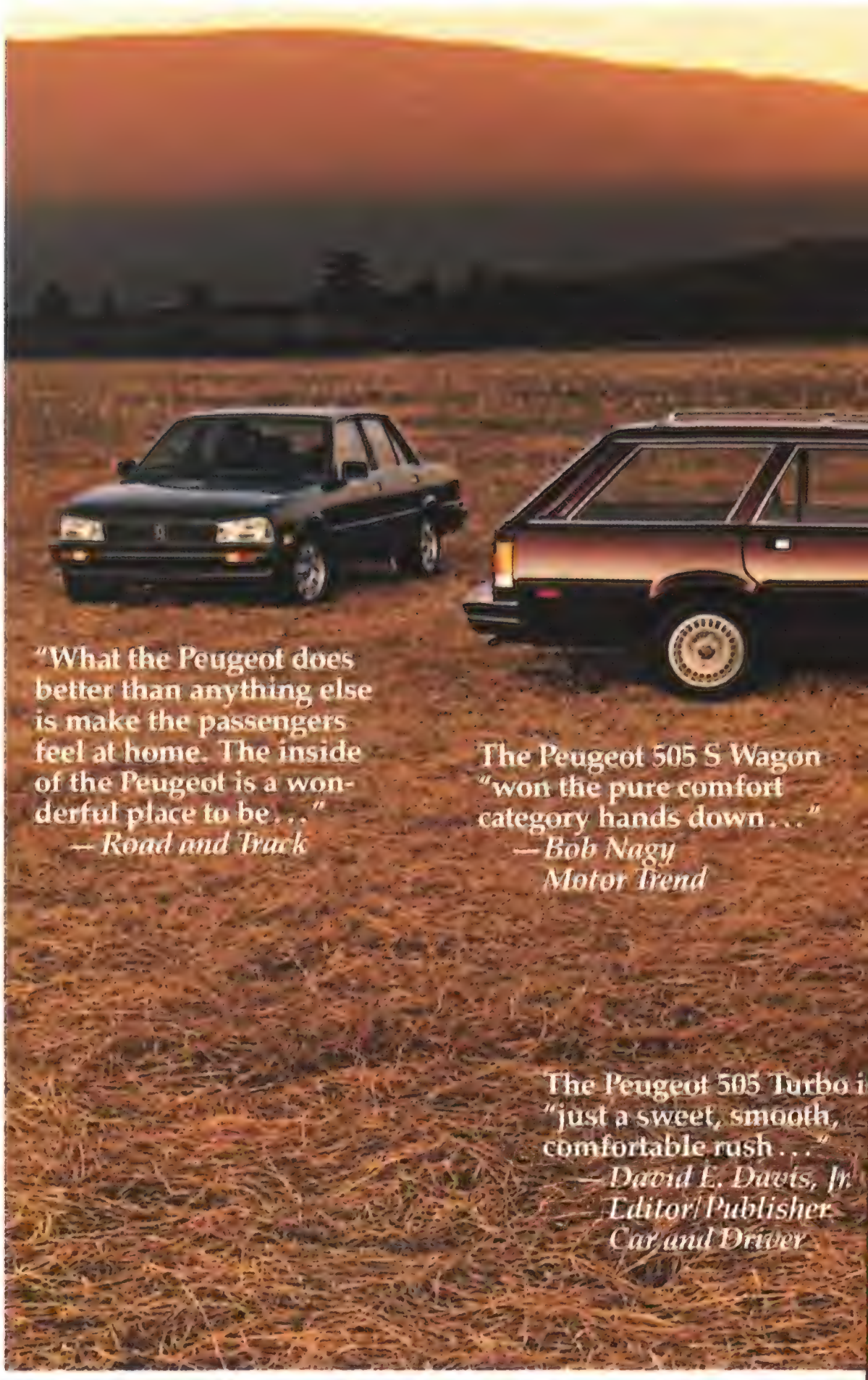
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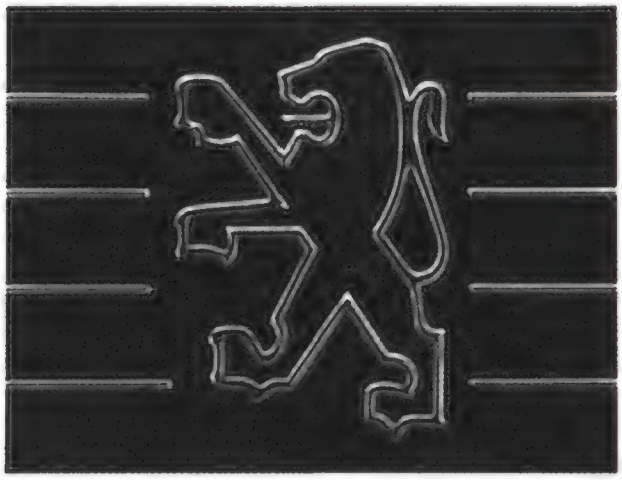

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PEUGEOT

Around the Mall and beyond

The paper airplane that Senator Jake Garn tried out during his shuttle flight last spring now occupies a display case near the museum shop at the National Air and Space Museum. I look upon it with mixed emotions.

In the first place, I don't think it's as good as the ones I make. Senator Garn tried it in front of television cameras and it just wobbled onto the floor, displaying no particular stability or airworthiness, or even the panache to achieve a spectacular crash. Secondly, Senator Garn has made it into space, and I haven't. And why *not*, I'd like to know.

Look at the two of us, colleagues at the Smithsonian—he a Regent, I a retired whatever. We both have flying experience —he with a Navy record starting in Korea, then thousands of hours with the Utah Air National Guard, I with uncomfortable memories of panic in New Guinea and then of occasionally flying a nice little hired Cessna on bright early mornings when there was no one else in the sky and the wind was down. Finally, we both are suitably bald.

Both of us had a firm purpose in wanting to get into the shuttle program. He, partly, he says, because "I've dealt with NASA for ten years" (he's chairman of the Senate appropriations subcommittee that keeps an eye on the NASA budget), and I because I wanted to be the first decadent old man in space. Suitably wired up, I would have broadcast intestinal rumblings that would have left his for dead.

And take the matter of age. The Senator is only 52, whereas I'm so old I can't remember big numbers anymore. His body has muscles instead of wattles; his mind is incisive, not bemused; his senses keen, not befogged. NASA *knew* that Jake Garn could handle the experience of space flight. Sending *me* would have been a lot more exciting for everyone.

To meet my successful rival, I visited Senator Garn's office in the Dirksen Building on the Senatorial side of the Capitol. I found him a brisk, well-organized man who certainly looked to me like an astronaut. "I wasn't really the first private citizen in space," he told me. "Charlie Walker was." He referred to the engineer (not a NASA engineer, but a commercial-payload specialist) who first flew aboard Discovery about a year ago.

"I see myself as a transition between payload specialist and private citizen," he said. A payload specialist is space talk for a nonastronaut whose specific duties concern the shuttle's cargo or experiments. And the first truly private citizen to make the glorious flight will be—as everyone by now knows—a schoolteacher. Will Senator Garn have anything to do with selecting the lucky one? "No way," he says firmly.

That selection process is a well-ordered procedure being monitored at NASA's Space Flight Participant Program office. I found the people there deeply involved with the 114 would-be "teacher-astronauts" recently screened by state officials from more than 10,000 applicants. The 114 come, two each, from every state, several U.S. territories, the Bureau of Indian Affairs schools and the overseas schools of the Departments of State and Defense. All have had a preliminary medical exam.

At the time I called in, they faced a formidable gauntlet: first a Washington workshop, then a national review panel. As you read this, the panel has already selected ten finalists, who then confronted NASA's Evaluation Committee, the doctors at the Johnson Space Center in Houston and final selection by Administrator James M. Beggs. By now we have probably heard an announcement of the names of the lucky two—the "primary" candidate and the "backup," or "Wonder Teacher" and "Daring Substitute."

I was struck by the huge response the idea of flight participation generated, even years before it was first announced in February 1982. Letters have long swamped the agency: "Dear Sir: I'm writing to represent Mr. _____, a teacher who wants to be the teacher to go up in space. I'm writing to tell you that I think he should be it because he is a very smart teacher and very nice. . . . Mr. _____ takes care of pets like fish, snakes, and a lot more. He gives candey if you do well."

Another youngster spoke up for himself: "I really like Space. I know about Orion and the Southern Cross . . . and Nebula. I think that there should be a kid in Space. . . . I am eight years old and I would train hard if I were picked to go . . . . P.S. I got help typing the letter."

And the teachers were not exactly reticent about expressing their desires. One had to admit that she had left her job to take care of her baby daughter. Knowing

Senator Garn exhibits paper plane that he test-flew on space shuttle.

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how NASA feels about continuity in the job, she implored the agency, "PLEASE DON'T STOP READING!!!"

I couldn't possibly stop, so I read that she had often told her students "that they could do or be anything they wanted if they would try hard enough. I wouldn't be true to those words if I didn't try now as hard as I can to be the 1st passenger on the Space Shuttle. I am your absolute *best* choice and no one wants to go more. . . ."

Then there's the letter from a school principal: "Dear Mr. President and NASA," he writes, "We believe that Miss _____ should be in outer space rather than on this planet, and we sincerely hope you will provide the transportation to get her there. She claims to be 24 years old, has a certificate of good health from a questionable medical practitioner, and is excruciatingly persistent (really, she'll keep bugging you till you finally pick her). . . ."

Alan Ladwig, who manages the rather hectic Space Flight Participant office at NASA, has a huge file of letters of interest dating back to NASA's first hints that everyday citizens were being considered for shuttle flights.

"Legal people want to be among the first batch," says Ladwig. "They feel they should untangle space law. Families want to go—Dad, Mother and a one-year-old. We've had inquiries from blacksmiths, policemen, firemen and a lot of nurses. Plumbers want to go along to fix the toilet problems. Tiny Tim wants to be married in space, and women have written in wanting to have babies up there."

Of course news people are awaiting their chance. Walter Cronkite would seem like a natural. And what about me?

I asked Senator Garn what was the hardest part of his trip. "Getting used to weightlessness," he answered unhesitatingly. "Your muscles are the same as ever, but your weight is zero. So when you give yourself a normal shove against a bulkhead down in the mid-deck, you become a human torpedo. All you need is a little push with a finger to move about. Sleeping was hard for me," he continued. "I really wanted that feeling of pressure against my body that you get in a bed."

And the best part? "The view. Looking down on our Earth is unbelievable. The Sinai Peninsula goes by, the valley of the Nile, the Amazon Basin. . . .You get an idea from the new film at the Air and Space Museum—*The Dream Is Alive*."

And so I took pains to see this new film, shot in good measure by the astronauts themselves with the 70mm IMAX camera (SMITHSONIAN, June 1985). Like everyone else, I came away exalted by the impact on eyes and ears and wits of power and glory beyond any experience. I gaped helplessly at the crash and flame of blastoff, filling that giant screen and thundering through that 360-degree sound system. I smiled at the astronauts floating around the mid-deck and felt I was with them. I joined in the drama of fixing a faulty satellite and lost myself in the view of the boot of Italy unrolling like a tapestry. So this is what it's like, I thought.

Then I remembered Jake Garn's words: "The difference between that wonderful film and the real thing is awesome. It's like seeing beautiful photographs of the Grand Canyon and then standing on the rim with it spread out in front of you. No one," he added, looking at me sternly, "not even a journalist, will find the words to describe it."

It's simple. We all have to go. All of us.

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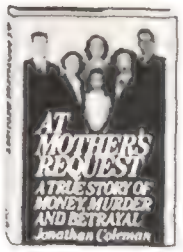

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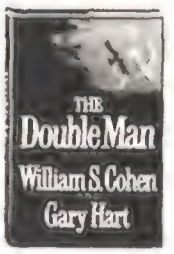

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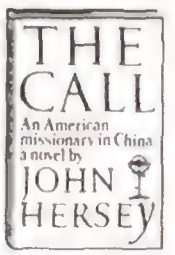

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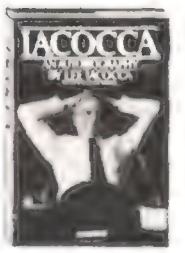

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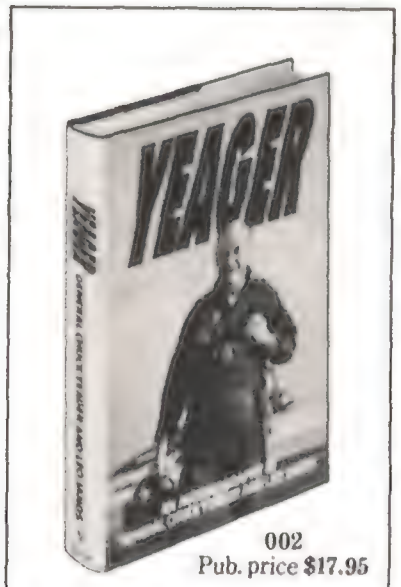

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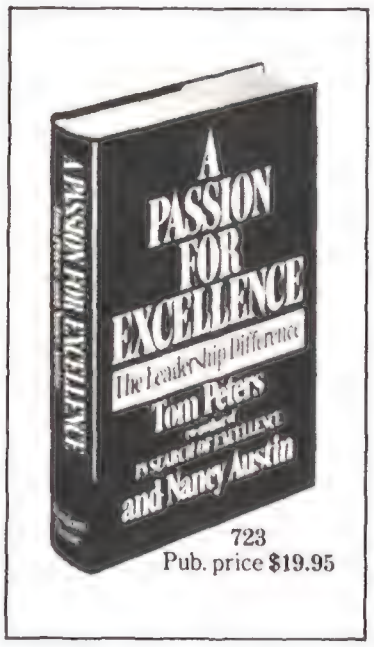

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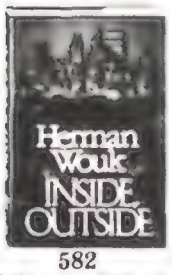

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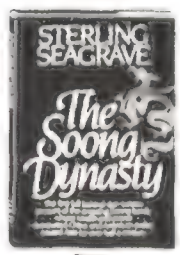

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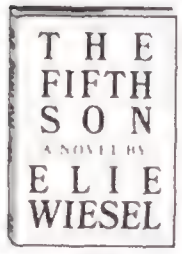

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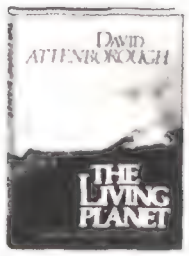

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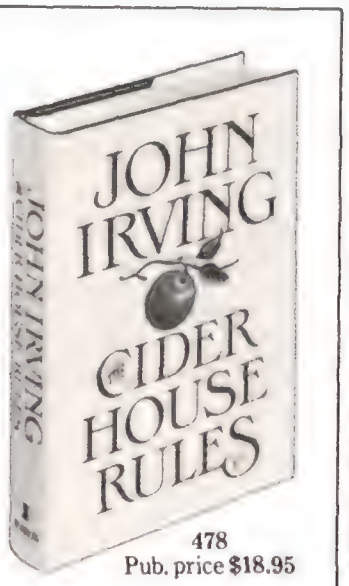

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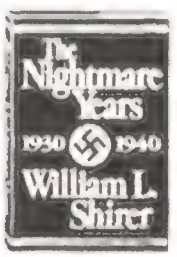

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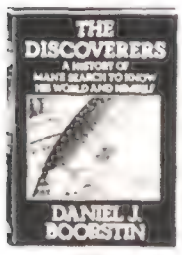

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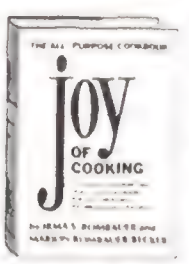

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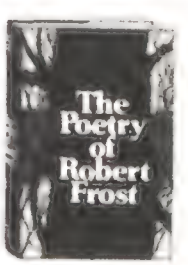

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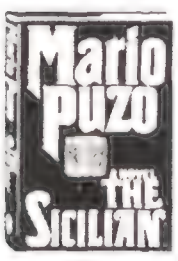

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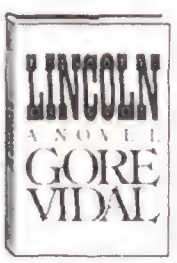

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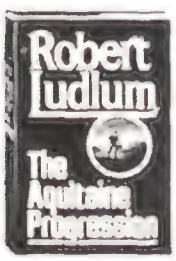

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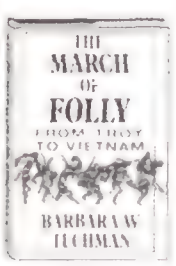

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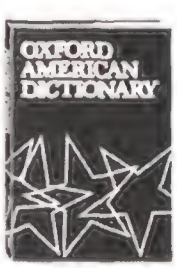

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Phenomena, comment and notes

Answers to such questions as "Why do stones skip?" may best be left alone—if only for our psyche's sake

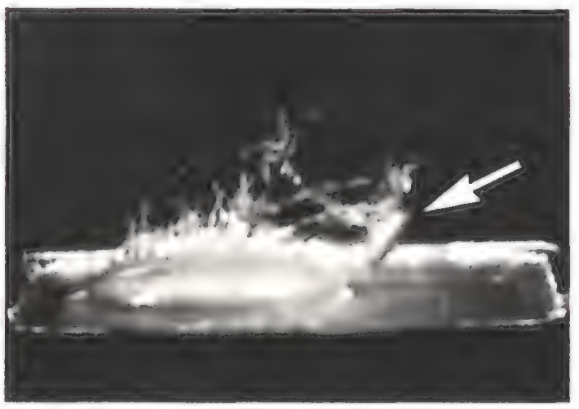
Everyone's done it. You're walking along a beach, enjoying the air, when your eye lights on a particularly well-shaped stone. Almost without thinking, you pick it up and send it sailing across the water, seeing how many times you can make it skip. I managed 11 skips one calm day on Lake Michigan, but that was a long time ago. What I find fascinating about the skipping stone, however, is not the number of hops it will take, but that modern science cannot explain what happens when the stone skips, nor can it even predict which stones will skip and which ones will not.

I first discovered this puzzle while browsing through an old issue of *Scientific American*. In 1957, Ernest Hunter Wright, a former head of the English department at Columbia University, was walking along a beach on a day when the surf was particularly rough—too rough, he had learned, to allow proper stone skipping. To pass the time, Wright started skipping stones on the wet sand left by retreating waves. Idly glancing at the marks left behind, he noticed a rather puzzling phenomenon. At the point where the stone first hit there were two marks in the sand, roughly four inches apart. They were followed by a long gap (corresponding to the first skip), then two more closely spaced marks, another gap, and so on. Stone after stone produced the same sort of marks, showing that the small rock was actually hitting twice on each subsequent hop.

Now this is not what you see when a stone skips on water. If you watch carefully, it seems to hit the water, perhaps skim along a bit, and then take off on the hop. Wright was intrigued by what he had discovered, and whiled away the rest of the afternoon experimenting with different kinds of stones. No matter what he did, the same pattern of two marks, a single hop and then two more marks kept recurring.

When he got back to Columbia, he asked his physicist friends why a stone appears to hit once on the water, but leaves two marks in the sand.

Although he didn't say so explicitly, I'm sure that the people he asked included a number of the Nobel Laureates who were at the university at that time. To a man, and to Wright's delight, they were unable to enlighten him. This led Wright to send his finding off to the "Amateur Scientist" column of *Scientific American*, where he wrote: "With the luck of a layman, I have had the novel experience of seeing several of the men who have plucked the heart out of the atom's mystery scratch their heads in vain for the solution of a problem which I now submit to a wider audience."



In high-speed photograph, stone (arrow) bursts from the water on its first skip.

Over the ensuing decade, Wright's account of the skipping stone generated no fewer than 10,000 letters, none of which, as far as I can tell, moved us any farther along the road to a solution. Finally, in 1967, a University of Connecticut High School student, Kirston Koths, took some photographs that solved at least part of the mystery. It turns out that when a spinning stone comes into contact with a hard surface like packed sand, the trailing edge usually hits first. The stone then topples, the leading edge strikes and the stone takes off again on a long hop. It was the twin marks of the back and front edges of the stone that Wright saw in the sand that day.

When a revolving, flat stone hits a fluid surface the behavior is quite different. When the trailing edge of the stone strikes, it doesn't flip, but planes across the water and tilts backward, causing a small wave to build up under the stone. The stone then takes off after skimming on this wave for a short distance.

So at least part of Wright's puzzle has been solved. We know that the reason a stone appears to behave differently when skipping on sand and water is that it *does* behave differently. But what about the deeper question of why the stone skips at all? Have scientists been able to understand this problem? More particularly, can a modern theoretical physicist, armed with the biggest and fastest number-crunching computer, tell you exactly how and why a stone skips?

In a word, no.

Let me be a little more precise about what I mean by this statement. The general principles that govern the behavior of a skipping stone have been known for at least a century. The difficulty comes in applying these general principles to the specific problem at hand. When I say that scientists can't tell you how or why a stone skips, I mean that if you tell me the size and shape of the stone, how fast it's moving and spinning, and the shape of the water surface, I can't tell you how far (or if) the stone will skip.

There are a number of reasons for this state of affairs. For one thing, anyone with the expertise and computer time to investigate this problem is much more likely to be working out what happens when an airplane wing slices through the air at the speed of sound than what happens when someone at the beach throws a stone. For another, the skipping stone involves almost every *bête noire* of modern fluid science: turbulent flow (in the wave that builds up), the interaction between a solid and a fluid surface, and disparities caused by the rough surfaces on the stone. As is the case in many other fields of science, applying general principles to a specific problem in the real world can get very messy. Whether you are talking about physics or economics, the real world is always infinitely more complex than anything you can possibly imagine in your theories.

Inaugurating The Franklin Mint's first series of precision die-cast models

The Mercedes 500K Special Roadster

Shown smaller than actual size of approximately 8½".

Scale: 1:24.

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LORD BYRON'S DILEMMA

(or, the lady or the Sambuca Romana)

Once a reputation reaches legendary proportions, fact and fiction tend to blur. In the case of George Gordon Noel Byron, a great deal is known but details are shadowy. He did move to Venice permanently in 1817. He was young and lame and handsome, and already notorious. The details of his infatuation with Sambuca Romana are harder to pin down.

It is said he first encountered this suave and elegant liqueur on an earlier visit to Rome, where it was, and still is, concocted from the berries of the wild elderbush. Smooth and mellow, with a fiery heart and an undercurrent of wildness, it soon became a passion. A passion equal to or surpassing an earlier love for coffee. If these things are so, we can be certain he indulged both pleasures while in Venice. The opportunities were there.

The story is told that it was in a Venetian cafe, early for a rendezvous, that he first ordered the two drinks at one time. His coffee arrived and, just as he saw his contessa stepping from her gondola, the liqueur. As he started to his feet, somehow jostling the waiter, the Sambuca Romana spilled, into the coffee. There was time for only one sip. He sipped, considered a moment, then sat down to finish the cup at his leisure.

It was plain the lady would have to wait. The attraction of this sensuous new taste was greater even than hers.

For the rest, we know Byron left Italy soon afterwards for Greece and his ultimate destiny. As for Sambuca Romana and coffee, the taste is history.

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So partly because of neglect, partly because of complexity, the problem Ernest Wright brought to the attention of the scientific community more than 25 years ago remains unsolved. If you are like everyone else I've told about this situation, your response is a feeling of delight. Something in the human soul is repelled by a world in which every problem is solved, every phenomenon neatly pigeonholed and cross-indexed. That something as familiar and homey as the skipping stone should elude the computerized net of logic being drawn ever more tightly around our world seems to reassure us, to tell us that no matter how much we learn there will still be some corner where we can respond to what we see with a simple feeling of wonder.

Don't misunderstand me—I am not saying the problem of the skipping stone is not soluble. If some federal agency decided to throw a few million dollars at the problem, I'm sure it could be brought under control in relatively short order. I wonder, though, whether the benefits to science that would result from such a program would outweigh the loss associated with the closing of yet one more gap through which our spirits can find a little room for freedom. Perhaps what we need is a sort of Wilderness Act for problems in the sciences: a list of phenomena which, by common consent, are to be left alone for the general spiritual benefit of humanity. My own candidates for the list would be the rings of Saturn, the causes of the common cold and, of course, the skipping stone.

James S. Trefil

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Models for Cleopatra, a Seventh Avenue designer, parade down the runway in the fashion rite of spring—unveiling the fall '85 collection. In the audience are the press and store buyers from around the country.

By James Traub

Behind all of that glitz and glitter, the Garment District means business

In front of their favorite gathering place, Dubrow's Cafeteria, industry people catch up on the latest news.

Ten thousand square yards of Manhattan churn out $12 billion a year in apparel to satisfy the taste of American women

Manhattan's Garment District is a sort of very small, very crowded, very insular and very rich country inside another slightly larger and richer country. The outer boundaries take in the entire apparel industry—mens-wear, children's wear, furs, hosiery, and so on—and stretch from Fifth Avenue all the way to Eighth and from 40th Street down to the low 20s. But the Garment District itself is the women's-apparel industry. In a couple of dozen buildings along Seventh Avenue and

Photographs by Marvin E. Newman

In his office, Girbaud partner Alan Goldin models the laid-back look that has put his firm on the map.

Broadway between 40th Street and the mid-30s, as well as the cross streets, $12 billion worth of women's apparel is designed and wholesaled every year. Ten thousand square yards of Manhattan, in other words, are responsible for most of the outer garments worn by 90 million American women. Look at your clothes, ladies, and say a silent prayer for Seventh Avenue.

What the Garment District is about, above all, is the clash of utterly unlike, self-regarding cultures—the world of the sidewalk, where "pushboys" thread through the all but impenetrable crowd with racks of clothes or textiles; the world of the garment cutter, old men who prize their scissors the way a ballplayer cherishes his mitt; the world of the budget manufacturer, the haggler who sells 10,000 pairs of polyester stretch pants at $11.25; the world of high, or not-so-high, fashion, where a thin skin of fantasy scarcely covers the muscle of hard bargaining. The Garment District has its themes, its recurring motifs, but the strongest one is particularity. Only at its leading edge has Seventh Avenue become so businesslike as to attain colorlessness. Within a generation everyone above the level of garment cutter may have an MBA and go to the same barber. These days, happily, the Garment District is a gallery of vivid images, hopelessly incapable of the soporific sameness of modern corporate culture.

Abe Schrader, a very small man with the traces of a Polish accent and a very large bank account, could be called the Isaac Bashevis Singer of Seventh Avenue. "My son Mort," he says, "is a millionaire. I am a multimultimultimillionaire." He gives each "multi" a different flavor, as if exuberantly tasting his inexplicable good fortune. Not that Abe was born poor: the Schraders were among the richest Jews in Poland until World War I, when the Cossacks put an end to business. In 1922 Abe hopped on a boat to Havana, took up with a Cuban girl and dallied for nine months, until an irate uncle ordered him to New York.

In the sweatshops, seven days a week

The women's apparel industry that Abe found in New York City was already well established. Beginning in the 1880s, Jewish immigrants from Central and Eastern Europe, many of them fleeing Czarist persecutions, had streamed into Manhattan. They brought with them the ability to cut clothes, and a determination to succeed in the New World. This influx continued until restrictions were placed on immigration in 1920; by that time, the flourishing industry had already passed the billion-dollar mark.

Those early decades had been difficult ones for the new arrivals. Typically, for a wage of five cents an hour, they put in 12 hours or more a day for seven days a week in crowded, damp sweatshops. Often the men

Overlooking Seventh Avenue, Schrader seamstresses assemble a prototype, to be worn by model for buyers.

Successful manufacturer Abe Schrader points proudly to picture behind desk of Lyndon Johnson's visit.

and women took work home to their tenements, where children also labored from dawn to dusk. In response to these horrible conditions, the International Ladies' Garment Workers' Union was founded in 1900.

The next ten years saw several major strikes, but it was the Triangle Shirtwaist Fire of 1911 that really brought an end to the sweatshop era. In this tragedy, 146 people died when they couldn't get out of the burning building because of locked exit doors and inadequate fire escapes. Genuine reforms followed this disaster, and by the 1920s, when Abe Schrader arrived, industrywide strikes had been almost completely replaced by labor-management cooperation; and along the 400s and 500s on Seventh Avenue the first completely fireproof showroom and factory buildings for the women's garment trade were going up. (The men's apparel industry, on the other hand, did not concentrate so heavily in New York City; Hartmarx, for example, is Chicago-based, while Levi Strauss is headquartered in San Francisco.)

When Abe got to New York, he didn't even cut clothes very well, which is what his uncle had the boy do. Until 1930 Abe was a wellborn young man wasting his time with a pair of scissors. Then he took the classical step of the apparel entrepreneur: he opened a factory of his own on West 38th Street, a block from his current address. He used to push the racks himself and he tells a story about those days that could be a scene from Yiddish theater. One day he was pushing a rack of coats from 22nd to 38th Street, where the manufacturer Morris Heft, a sainted name in Abe's memory, had his office. It was snowing and the young man took off his jacket to cover the coats. He arrived in Heft's workroom "bedecked with snow." The great man was stunned that a contractor would risk his health for someone else's coats. "Some day," he declared, "you will be a very rich man." Abe made his first million in 1943, turning out uniforms for the WACs as well as the usual coats and suits.

In the postwar years, with European factories destroyed, Abe started multiplying the millions. But he saw that the feast wouldn't last forever—or, more likely, he decided to acquire a social status equal to his wealth —so he joined the manufacturers on Seventh Avenue. In fact, he literally moved one block to the east and opened up the firm of Arkin and Schrader, later Abe Schrader Inc. It wasn't the dramatic move it would be today, since at the time a reputable manufacturer didn't turn out "fashion" so much as a quality item. The difference was that Abe now was the owner of what he made.

Abe didn't know a thing about design, but he had a sharp eye for what the customer wanted. "I tell you," he says, "how I started making dresses with jackets"—the Abe Schrader signature in the mid-50s. "There

Freelancer James Traub's article on rail riders appeared in the November 1984 SMITHSONIAN.

wasn't much air conditioning then, and I used to walk into air-conditioned restaurants and see the women there wearing a jacket, when it was 85, 90 degrees outside. So I realized that women needed jackets all year around." By his second year in business Abe Schrader was grossing a phenomenal $6 million, and the suits were selling in Bergdorf Goodman and Saks Fifth Avenue for $70 to $80. In 1955 Abe's elder son, Mort, came out of the service and joined the firm; rich kid though he was, Mort started out in the shipping room, the traditional lesson in humility for rich boys.

Abe is basically a cheerful, expansive, philosophical fellow, eager to talk about the Talmud or Karl Marx, to tell you what he told LBJ, or Jimmy Carter, or Hugh Carey, former Governor of New York; but, like many another old man—he is 80—Abe has seen a great many changes in the industry: matronly tailored suits have given way to the loose-fitting linen look. Still, he says affably, the hallmark of the business remains the same: "It was money, money then, and it's money, money now."

Jeans with a je ne sais quoi

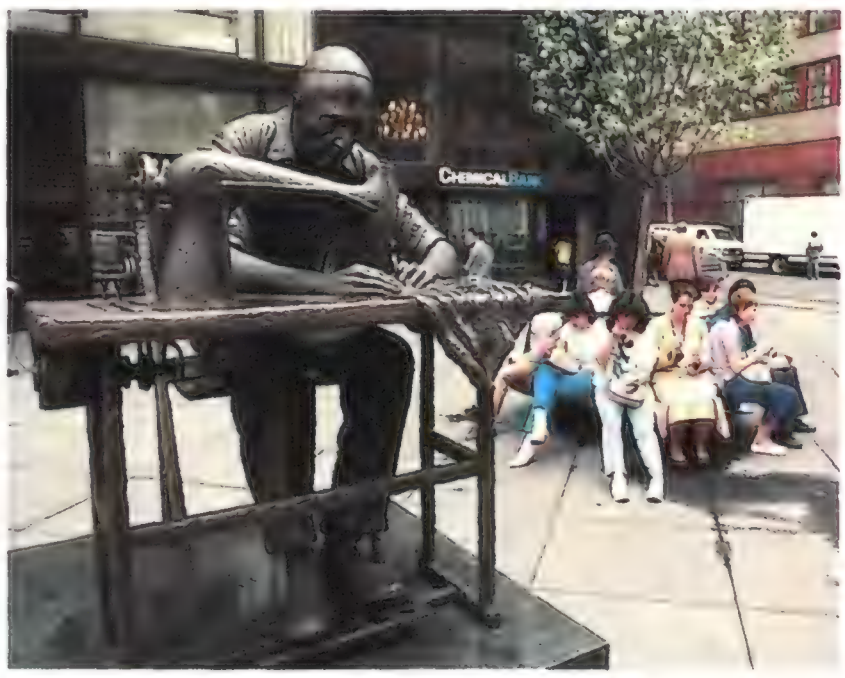
Alan Goldin, a new kid on the block compared with Abe Schrader, is a businessman currently making a great deal of money. But that doesn't stop him from describing himself as a radical, an idealist. Clothes, to him, are a statement, a concept, a social posture. Goldin used to make his own far-out clothes in Canada, but he crossed the border to bring the revolutionary Marithé and François Girbaud look to America. In 1981, he found an American manufacturer for the Girbauds' new look in jeans, a baggy, battered balloon rather than a sexy sheath. And the rest is history.

By 1983, when the bottom had fallen out of the designer-jeans market, Girbaud jeans were on their way to cult status. At $50 and up they were far too expensive for jeans, but it didn't make any difference. The Girbauds were redefining the jeans in America, as they had in Europe. Suddenly everyone wanted to do jeans again, only just like Girbaud. It was a populist revolution, the consumers against the experts; or that, at any rate, is how Alan Goldin depicts it. The jeans just had this mystique. Bruce Springsteen may wear a pair, waist 30, on the cover of his next record album. I know this because the Girbaud people brought me his jeans to touch.

What happened? The analysis of fashion trends probably belongs in the realm of mob psychology rather than esthetics. Of course the Girbauds make a good pair of pants. The jeans are cut wide, so they're easy to wear. But four or five years ago women wanted jeans that were hard to wear; "easy" is not inherently preferable. Nothing is inherently good in fashion, at

Intense pickup conversation over fabric swatch is among more common scenes along Seventh Avenue.

In 1985 Easter Parade, New York's Mayor Koch joins ILGWU delegation protesting foreign import levels.



For her sculpture near ILGWU headquarters, Judith Weller used her father, a garment worker, as model.

The most ubiquitous sight of all in the Garment District: pushboys roll dresses down Seventh Avenue.

Adroitly weaving among pedestrians, sneaker-clad street athletes deliver fabric bolts to a designer.

least not in women's fashion; clothes that sell wildly are clothes whose mood, whose aura, blends with or teases some mood in the culture.

When people like Alan Goldin say "the street," as in "what they're wearing on the street," they usually mean Greenwich Village or SoHo or some other neighborhood where clothes are something people think about. But if they would only look to the street below, Seventh Avenue, they could learn something about the timeless appeal of the ski parka and the hooded sweat shirt (SMITHSONIAN, January 1985). That, at least, was what the Garment District's street people, the pushboys, were wearing this past winter as they mushed racks of fabric or garments through the snow and the freezing wind. The look was casual, logical and certainly not too stylish at all.

Pushboys, or handlers as they are officially called, have been the human transportation of the Garment District since there was a Garment District. Their terminal points are trucking offices, shipping/receiving offices and manufacturers' offices. Piece goods—bolts of fabric—that have been purchased abroad, for example, may be taken off the boat, trucked into a holding area in the Garment District and then pushed on a rack to the manufacturer who ordered them. Cut goods, so called, may be taken downstairs from the cutting room, pushed to a trucker's shipping room and then driven down to Chinatown to be stitched. The process will be reversed when they return. A man wearing a pair of sneakers can move goods through the Garment District a lot faster than a truck.

In wait for the unwary: thieves

It seems like straightforward work but, of course, it's not. "You got to be thinking every minute of the day," says Al Cosgrove, a short, stout and amazingly cheerful gentleman who started pushing racks in 1939, when he was 13. "You got to watch out for this guy, you got to watch out for that guy, you got to watch for the traffic, you got to watch that cop." The careless, he says, occasionally wind up beneath the wheels of trucks. Thieves lie in wait for the unwary, snatching a few dresses in broad daylight and disappearing into the traffic. Cosgrove pulls down a grand total of $275 a week to face these perils, but if the Garment District tourist bureau is thinking about a promotional campaign, he's their man. "The way I see it," he says, leaning against a huge pile of wrapped piece goods in the 30-degree chill, "is that it's the people who stay inside who get sick. You gotta get out, get some rain on you, get some snow on you, stop for lunch, pick up a hamburger, go back out, and you feel good. You know?" Sure.

This colloquy was conducted on West 35th between

An endangered species, piece-goods jobber Nathan Garfinkel poses with tool of his trade—the telephone.

Granardo Dress Company sewing shop, family-owned for three generations, makes garments for designers.

Seventh and Eighth Avenues, a thoroughfare given over mostly to trucks, truckers and handlers. Young men pushing hand trucks and "tins"—the standard, four-wheeled rack—shot back and forth, shouting some equivalent of "Gangway!" The sidewalk was only about eight feet deep, and I felt like I was standing in the Islip Speedway during a demolition derby. "Crowded?" Al snorted. "Used to be you couldn't even walk down the street. They'd have you pushed right up against the building because there wasn't any room on the sidewalk." He was warming up. He told me about childhood memories of cobblestone streets and bread delivered by horse and wagon, and, later, of benevolent tyrants who worked him 20 hours a day but gave him a fat Christmas bonus. He told me about the harsh weather back then: "Much colder. It snowed all the time."

The District's most difficult work

Thirty or 40 years ago there were a lot of garment cutters on Seventh Avenue. Now, the garment cutter is a noble old species tenaciously hanging on at the edge of Seventh Avenue. Most cutting goes on beyond the Hudson—in New Jersey or Ohio or Hong Kong—but smaller operations, as well as some of the fine dressmakers, still keep their cutting rooms close by. Cutting remains a largely Italian occupation, as it has been for about 75 years.

When I arrived at the cutting room of dress designer Pauline Trigère, I was given into the care of Vincent Belli. Belli is a tall, thin man who has grown slightly stooped after 35 years in the business, but who dragged me eagerly back and forth along wide tables. "This," he said, sweeping his hand over the tables, the long rolls of the fabric, the garments hanging from the low ceiling, "is the most difficult work in the Garment District." Shades of Al Cosgrove. Garments have been cut pretty much the same way for the past century, although the invention of the electric knife—really a rotary blade—allows up to several hundred garments to be cut simultaneously. Fine craftsmen like Belli, though, use a heavy, oversize pair of shears as the tool of their trade. The cutter rolls out a length of fabric, superimposes on it a set of up to a dozen "markers" cut to the size and shape of the parts of the garment, and cuts along lines indicated on the markers.

Of course it's actually about ten times more complicated than that. When the designer is using a patterned fabric, the cutter must make sure that the pattern of one piece will be properly coordinated with its neighbor—a collar, say, with the upper portion of a blouse. All of this is minutely indicated with swatches of fabric on the marker, as well as on a long list. Sometimes the fabric itself is printed crooked, which is enough to

make a cutter take a pair of shears to his throat, since a dress at the end of a roll will then look different from a dress at the beginning. "Ninety-eight percent of our battle is fabric," Vincent explained. A single dress generally takes half a day to cut.

The morning I came by, Vincent and the others were cutting individual dresses to be used as samples. But cutting garments by the hundred is virtually a different skill. Economy becomes the paramount issue. Markers must be tediously mapped out against the length and width of the fabric to waste as little material as possible. This design is transferred to tracing paper, which is then laid over the thicknesses of fabric. A skillful cutter won't waste more than 20 percent of the fabric, though it may take him hours to lay the pattern out, and hours more to lay out additional patterns for each size. Large organizations, like Abe Schrader, now do the marking by computer, first aligning electronic versions of the markers on a screen and then printing them out on a vast piece of tracing paper. Computerization saves not only countless hours but also a few precious inches of fabric. Every lost inch is another quarter or so, and most apparel manufacturers watch quarters the way sheep dogs watch sheep.

A niche big enough to park a truck in

The cynosure of all eyes along Seventh Avenue is the nine-year-old firm of Liz Claiborne Inc. While the rest of the apparel industry is locked in the doldrums, Liz Claiborne grows by an insane 70 percent annually. The principal reason for this is mentioned so often around the firm that it has been polished into a slogan: "We offer designer clothes at nondesigner prices." This idea represents a fundamental change in the way Seventh Avenue does business. Until recently the demand for fashion, as opposed simply to nice clothes, came almost exclusively from the moneyed class. Only in the past ten or 15 years have millions of middle-class women dedicated themselves to looking as smart as the rich. Liz Claiborne has succeeded to the highest possible degree in applying the efficiency of the modern corporation to that evanescent and idiosyncratic thing called fashion.

Secondly, Liz Claiborne discovered a niche big enough to park a truck in. The company was based on the observation that nobody was making stylish clothes for working women, a group whose phenomenal growth over the past decade has been "the biggest change in our business since the postwar Baby Boom," in the words of a Claiborne executive. It was these women who formed the new mass constituency of fashion: they had to look good at work, and they had the money to buy clothes. Liz Claiborne created a kind of color-by-the-numbers fashion that saved both time

In Pauline Trigère workshop, 35-year veteran Vincent Belli still cuts dresses the old way—one at a time.

Grande dame of Garment District, Pauline Trigère creates dresses by cutting fabric rather than sketching.

Fall '85 collection showing at Christophe de Menil: buyers will compare lines while press lend publicity.

and anxiety. She designs clusters of skirts, shirts, blouses and sweaters that can be mixed and matched, and are always hung together in store displays so as to educate the customer.

The incredible efficiency of large firms like Liz Claiborne isn't good news for everyone on Seventh Avenue, however. Nathan Garfinkel, a large, lumbering man, is a piece-goods jobber. He is also what they call on Seventh Avenue a "garmento," a lineal descendant of the street peddler who wheels and deals and wheedles his way to a precarious livelihood. "Garmento" is a term of derision used by Seventh Avenue's more up-to-date folk, who are embarrassed by the persistence of the industry's folkloric past. The garmento belongs in a glass case, but some members of the species aren't ready yet. Garfinkel himself, who has been buying and selling fabric for 50 years now, does seem ready. His office is a bare cell whose walls are covered by a scarred, unraveling fibrous material. His equipment consists of a desk, a phone and a lamp. He and the place appear equally battle-weary.

Jobbers, whether of textiles, like Garfinkel, or of garments, basically juggle nickels for a living. Garfinkel buys discounted piece goods and resells them for a skinny profit, depending on high volume to make a living out of it. He has to know who's in trouble—who has excess material on their hands—and bargain his way down to a good price. A mill, for example, may ship fabric late, the manufacturer may reject it—and Nathan Garfinkel is on the phone, offering three dollars a yard instead of four. A manufacturer may have ordered material for a garment that nobody wants, and be eager to unload it. Garfinkel will wait until he can get a good price. Sometimes he buys summer goods in winter, or vice versa. It's a question of eternal vigilance and the swift strike. Another, more prosperous-looking, jobber puts it delicately. "We are . . . I wouldn't say the word is 'predator' . . . we are 'opportunists.' "

The garmento: Is he going under?

But the day of the Garfinkel, if not the garmento, may be drawing to a close. As the apparel business has grown more and more consolidated, Garfinkel and his dwindling competitors have lost one account after another. Today's large, well-run firm is less likely than in days of yore to order too little or too much material. "It's a dying business," says Garfinkel. "If I had a nice, bright son who went to Harvard or Wharton"—what every old man in the garment business dreams about—"I certainly wouldn't use him here."

The operative law of fashion in New York, as of everything else in New York, is change. Nothing is inconceivable, so long as it's new. Men wearing skirts?

In Seventh Avenue showroom, designer Cleopatra discusses a wool-and-angora skirt-and-sweater set with two buyers from Neiman-Marcus. Despite the hype of large showings, the sale is really made right here.

Why not? Women wearing jumbled layers of fabric that barely cohere into a dress? Go for it. Today's ineradicable standards are on tomorrow's junk heap. The idea that fashion might have an almost fixed esthetic and could aspire to be "classic"—elegant, simple, well-wrought, timeless—has been almost forgotten. Almost, but not quite. Pauline Trigère, the doyenne of Seventh Avenue, still makes clothes the old-fashioned way. Rooted not in "the streets" but in the tradition of Parisian haute couture, Trigère seems as out of place on Seventh Avenue, and perhaps as doomed, as Nathan Garfinkel.

Her 16th-floor offices are referred to as an atelier, and they do indeed feel more like a studio than a business. The artist herself is never far from view. Anyone who wanders into the workroom, in back, can watch Pauline Trigère designing dresses. I was in the midst of a tour with Trigère's longtime associate, Lucie Porges, when the designer herself suddenly materialized, as is her wont, at the cutting table by my side. She was decked in her familiar trademarks—horn-rimmed tinted glasses, thick gold rings that stand up from her fingers. She combined, somehow, grandeur, coquetry and garrulousness, like a veteran film star who has for a moment stepped down from her pedestal.

Trigère picked up a pair of shears, which have been custom-molded to the shape of her fingers, and began cutting a shape out of a bolt of lightweight Italian cotton, a print of brown with rust-colored flowers. She talked as she snipped. "Of course it's very expensive to cut right on the fabric like this, but it gives me an inspiration. I do this instead of sketching, the way other designers do. I make a terrible sketch," she laughs, with the secure self-mockery of the successful, "but, you know, so did Chanel and Lanvin and Balenciaga." She drapes the fabric over a mannequin and gathers it into folds with pins, chatting all the while.

My tour resumes, and about ten minutes later I am standing in the shipping room talking about piece goods and schedules and whatnot. Trigère has tracked me down. She breezes into the shipping room and says with a practiced theatrical air, "Let me show you something." Behind her, on cue, comes a model, wearing the familiar brown cotton—now, suddenly, a dress—with a scarf draped over her shoulder and cinched beneath a belt. A small miracle—like watching a lump of clay turn into a sculpture.

The Garment District may be unique in the extent

Jade Hobson (left), Grace Mirabella and Polly Mellen, *Vogue* magazine editors, view a fall '85 collection.

to which it feels bullied and tyrannized by its own customers—the buyers who represent the department stores, boutiques, PXs and so on in which clothes are sold. Manufacturers talk about selling as if they were playing poker against the house. This thrilling but nerve-wracking combat is joined two or three times a year, when buyers arrive to shop a new collection. During these skirmishes, known as "market week," the normally intense level of activity in the Garment District rises to pure frenzy. Fortunes, reputations and tempers plummet and soar.

Most manufacturers were afraid to let me witness the bloodletting. "I'm sorry," said Joe Bubble of Cos Cob, "but there's just too much hostility." But the folks at Liz Claiborne, supremely confident, told me to sit right down. I spent several hours watching Gail Kedrus show the whole misses' sportswear line to Gail Vasquez, a buyer from Bullock's, a major account in Southern California.

"This I'm going to buy," said Gail Vasquez, pointing to a matched blouse and pleated skirt of patterned rayon—"two-piece dressing," it was called. "That"—pointing to what looked like the identical outfit hanging next to it—"I'm not going to buy."

"How many?"

"A hundred and eighty."

Gail K. looked at Gail V. in shock. "A hundred and eighty? A hundred and eighty? I'm not winning." She turned and talked to an apparently sympathetic window. "I haven't won at all today."

Once she had recovered from her shock Gail K. fetched a line of tops and skirts in mixed black-and-white checks—the "positive/negative" line. This time Gail Vasquez's eyes popped.

"I love it," she squealed. "I already love it. God, it's great. Forget it, is that cute? Adorable. Fabulous. Forget it, it's a winner." Her adversary, or rather partner, smiled weakly and sighed the sigh of the borderline ulcerous.

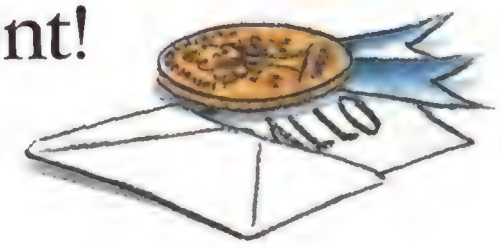
I left and returned later in the day. The Gails were exhausted. "It's too expensive," said Gail V. "It's handknit," retorted Gail K. "The armhole is too small." "It's not small." "I hate it. Go on. Next. I like it." They were gasping for air. Finally, they disengaged.

Despite all the sound and fury, Gail Vasquez spent precisely as much money as Gail Kedrus expected she would. This alone puts Liz Claiborne in a very select category. The last several seasons have been extremely poor for most retailers. Unable, for several reasons, to sell at list price, retailers have been discounting to an unprecedented degree. Volume has remained high, but profit margins have shrunk. Rather than eat the loss, most retailers have been insisting that manufacturers offer discounts and rebates. The word for this transaction, at least on Seventh Avenue, is "blackmail," and it has manufacturers helpless, not to say speechless, with rage. Richard Fischer, president of Tahari, a sportswear firm, has several dozen expressions for this ugly state of affairs. Perhaps the pithiest is: "There's this attitude in retailing: '*We've* got to make a profit this year; *you* don't.' "

For this and several other reasons, manufacturers have been shutting their doors with alarming frequency. Seventh Avenue's very future seems open to question, at least among the panic-stricken. "It's total annihilation out there," says Joe Bubble, "and it looks like it's only going to get worse, at least for the next 12 to 18 months." Even the hard-pressed jobbers have professional reasons to stay abreast of the Garment District's misery. "I don't like to see it," one says generously, "but I don't want to be walking past these buildings in a few months, because there may be people dropping out of windows."

Well, that's a little dire, really. Those few dozen skyscrapers are not about to come a-tumbling down, and neither are their inhabitants. Seventh Avenue and the women of America have been locked in a tight embrace for 75 years or so, and they scarcely seem ready to part. There is, however, the melancholy prospect that the Garment District will shed its Polish accent and frenzied manner and love of the haggle and become more or less Claibornized. Perhaps the garmento will go the way of the girdle. Still, it's premature to put him on the endangered species list. He has the elemental force of the immigrant and the entrepreneur—the force that has shaped Seventh Avenue, and seems likely to shape it till the crack of doom.

At showing of Oscar de la Renta's fall collection, model coolly strikes a pose for jostling photographers.



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What do you think of that, Monsieur Dupont?

Monsieur Dupont?

Today's Gallo.

By Doug Stewart

Teachers aim at turning loose the mind's eyes

Challenging students to reason with images instead of words, to think sideways and upside down, schools now teach imagination

Visual-thinking instructor David Haygood illustrates principle of making the familiar strange at Stanford.

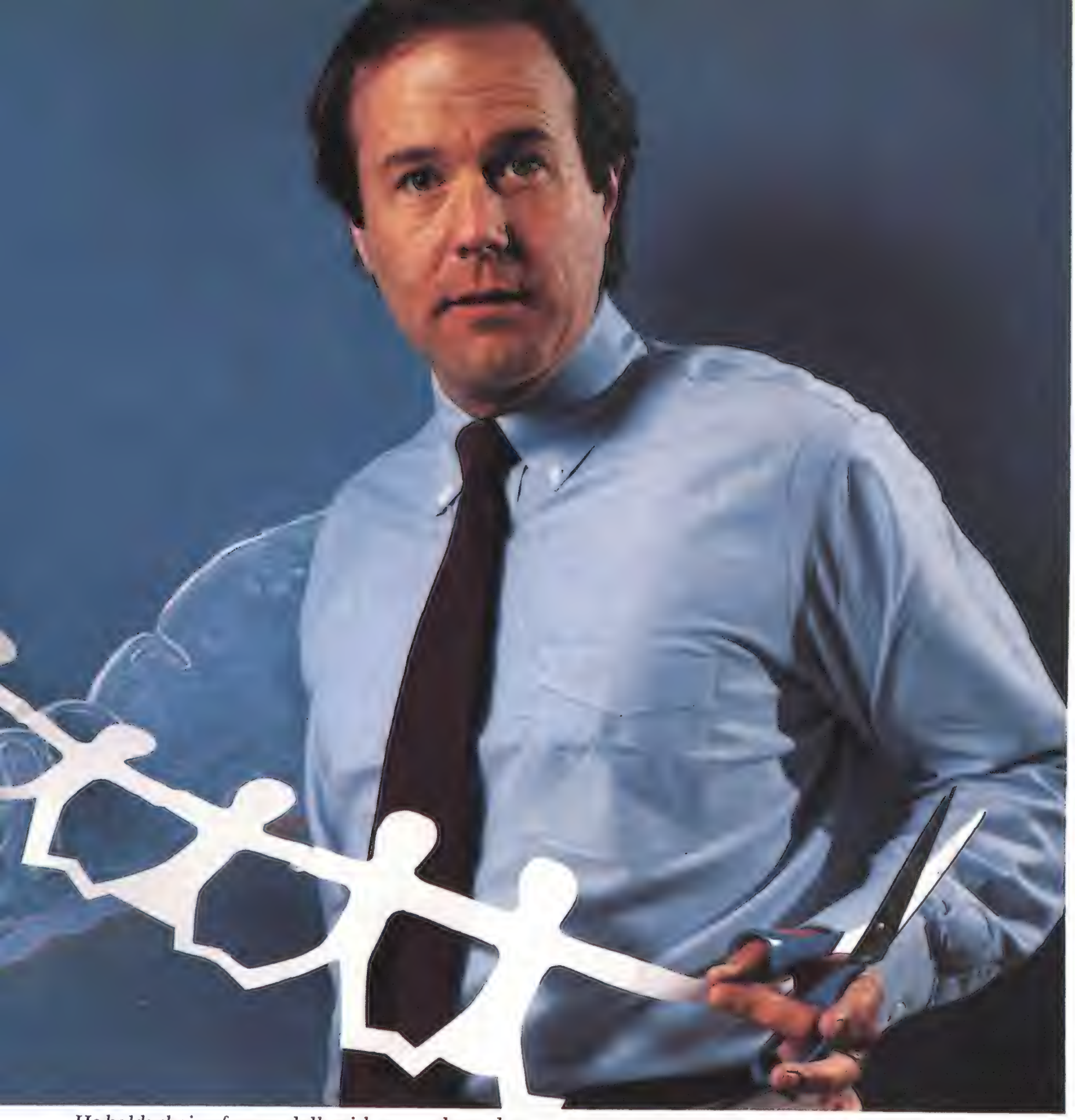
Jim Rymarcsuk, decked out in a purple bow tie and bright red boots, trudges across the linoleum floor of a classroom at Stanford University, dragging a large inner tube behind him. The inner tube provides air pressure for a plastic slide whistle attached to his right ankle. Rymarcsuk, a 20-year-old mechanical engineering major, pauses every few seconds to balance on his left foot, which enables him to operate the whistle's slide by raising and lowering his right. His classmates on the sidelines give him a round of applause after he labors through "Mary Had a Little Lamb."

Rymarcsuk and his fellow students are enrolled in Mechanical Engineering 101, "Visual Thinking," and I'm on hand to see them demonstrate their projects. The assignment has been to design a pair of shoes that plays a musical composition as you walk ten or more feet in them, a task that Rymarcsuk has interpreted rather loosely. The project description passed out to students began, "Ever wonder why most people play music with their hands but dance with their feet? What would it be like the other way around?"

That upside-down point of view is at the heart of ME 101 and a growing number of other visual-thinking courses around the country. If these courses had a motto, it would be, "Make the familiar strange." The goal in each case is to free the eyes and the mind from stereotypes and taboos and to see surroundings in new ways, make connections between unlikely elements, and sketch, tinker and imagine until ideas emerge.

"We'd rather see a spectacular, innovative failure than a tightly developed successful one," says David Haygood, one of ME 101's instructors this year and an ardent believer in the unexpected. He notes that the course is popular with everyone, not just engineers. "You should be willing to pop around in different directions, even ones that aren't very good," he says. "Without that, there's no poof, no aha!, no magic."

Before settling on his air-powered slide whistle, Jim Rymarcsuk cruised the local junk stores for several



He holds chain of paper dolls with one end taped to blackboard, where drawing of arm fools the eye.

days (the projects have a $20 ceiling), looking at familiar objects and trying to imagine new uses for them. At the outset, the instructors encouraged the class to make lists of ways that instruments could be played (plucked, squeezed, shaken, popped) and ways of moving (crutches, skateboards, pogo sticks), then look for ways to link them. As the demonstration proceeds, most of the students get into the freewheeling, easy-on-the-criticism spirit of the assignment, although most of the music that they generate is, to put it charitably, atonal.

For the project, "shoe" is defined as a device or assembly connected to the leg below the knee. One young man wears a motley pair of bowling shoes with the fronts torn off, the better to articulate trumpet-style keys with his toes. A young woman inches intently across the room, eyes on the floor, as pieces of her mysterious and inoperable machine drop off behind her—

Photographs by Mark Kauffman and Richard Howard

Robert McKim visually points out the right-left brain functions, with posies for creativity, an A for logic.

For assignment to design shoes that play music as he walks, Jim Rymarcsuk uses ankle whistle, inner tube.

some kind of ski tow, by the looks of it. Haygood cheerfully calls out, "Ten feet! Ten feet!" to cut short the less successful walks.

What is being taught here is not hard-core engineering but something more intangible: imagination. The course is the brainchild of Bob McKim, who wrote the basic text for ME 101, a book called *Experiences in Visual Thinking*. McKim is a design professor at Stanford, and an informal, easily amused man who himself likes to fiddle with scissors, tape and pieces of shirt cardboard. "Back in the early Sixties here, I was teaching students how to design new products," he recalls. "I noticed that many of our students had trouble generating new ideas. They'd say, literally, 'I don't have any imagination.' What they'd been rewarded for in school was to manipulate words and numbers and pick single answers on multiple-choice quizzes." They were, McKim decided, visual illiterates.

He began teaching basic sketching skills to his students. He soon realized the students had trouble not only drawing but seeing. They took the objects around them for granted, looking closely enough only to give them labels like "table" and "door" and stopping there. (Quick—without looking, draw your telephone on a piece of paper, letters and numbers in place. It should be easy. You've looked at it thousands of times, haven't you?) One of the exercises McKim recommends is looking around a room and grouping objects

by color (rediture) or texture (smoothiture), rather than function (furniture). Viewed in this way, he says, the shapes, colors and patterns of one's surroundings begin to emerge from what he calls the shadow of familiarity.

"Visual thinking breaks you out of the mindset of language, which keeps you stuck in a certain way of seeing and expressing the world," McKim says. He makes clear he doesn't expect people to do all their thinking in images. Words, logic and numbers are indispensable, he says, especially in refining and testing an idea. Rather, images provide a rich, expressive medium for thought that complements analytical reasoning and offers quicker, more unexpected jumps and connections.

"We don't really know what thinking is all about," McKim says. "It takes place below the threshold of consciousness. All we know are the results of it. With visual thinking, the results are images."

To McKim, imagery is more than what your eyes see and your hand sketches. There is also inner imagery, what you see with your eyes closed. One's ability to picture imaginary scenes can be strengthened with practice, he believes. His book is filled with exercises in imagining. Stop reading, for example, shut your eyes, and imagine an apple. What did you see? Most people will summon up a featureless red apple, perhaps even a vague, black-and-white apple. Now, imagine you're actually holding a crisp, ripe apple. Feel its weight, its waxy skin, its coolness. Feel for bruises. Play with its stem. Now imagine biting into the apple. Hear the crunch. Smell and taste its juice. Who wouldn't conjure up a more realistic, three-dimensional apple the second time around?

Exercises like this, McKim says, make us think more vividly. When problems are imagined in such a tangible, seeable way, solutions come to mind with more force, more variety and more detail. "As designers here, we're trying to design things that don't exist, not sketch things we see," McKim tells me, "so we need to use inner imagery and make our sketches from that."

Across the continent at the Massachusetts Institute of Technology, Woodie Flowers teaches a similar class —ME 2.70, Introduction to Design. Flowers, a Louisiana native with large, sleepy eyes and a twangy voice, readily admits his course is "McKimish." Here, however, as befits MIT's more hard-edged image, students visualize bricks as well as apples.

"The first time the students meet in the lab, we have an easy contest to break the ice," Flowers says, perched on a high stool in his Cambridge office. "We might pass around a brick and say, 'Feel it, remember it.' Then we give everyone some computer cards and say, 'Build a tower at least two card-lengths high that can support the brick.' " The winner, Flowers says, is the student with the lowest-cost tower, cost being determined by the total number of cards, folds and staples used. To prevent the students from doing too much testing and not enough visualizing, the brick remains off limits until each structure is completed.

Such little games are a precursor to a much bigger drama, a two-night trial by fire in which the course's 200-odd students pit their final projects against one another. Using identical kits of ingredients—cardboard tubing, string, parts of Venetian blinds, electric motors—the students build devices designed to per-

Group doodle is used as a warm-up exercise at start of Stanford course; as many as 60 students participate.

Doug Stewart is a freelance writer in Ipswich, Massachusetts, who specializes in scientific subjects.

Annabelle Kim makes Spinmobile to gather Ping-Pong balls in MIT contest, and gives it a test (above). The machine is a product of "lateral" thinking, as she tried different designs before making final choice.

form some specified task such as putting a round peg in a square hole. Each device must carry out its job in 20 seconds while a competing student's device tries to do likewise from the opposite end of a lab table.

This year's contest is called "The Harvest." The battleground is a four-by-six-foot table with model hills, valleys and occasional obstacles. Clogging the landscape are 300 Ping-Pong balls. The machines' function is to gather the balls as quickly as possible.

Squeezing into the auditorium a half-hour before the start of the first night's competition, I'm barely able to find a seat. Boisterous undergraduates with cameras and noisemakers soon pack the aisles and line the walls. As the elimination rounds proceed, an impressive variety of rickety-looking machines do battle with the Ping-Pong balls and each other—bulldozers, sweepers, scoops, rakes, paddlewheels and assorted hybrids. One device rolls forward and slips a wide spatula under a mass of balls. The spatula slowly rises and the balls roll back over the device's inclined roof and into the home gutter. A number of machines, including the eventual winner, are low, square tractors that drive over a group of balls, then pull them back using one-way, comblike fingers along the front end.

The ambience in the hall is a far cry from the mellow mood at Stanford. After one machine refuses to budge and its opponent tips over at the other end, flailing helplessly like a wounded praying mantis, the referees call a double loss and the crowd roars its approval.

The Stanford and MIT courses may differ in character, but they share a common goal: to spur students to come up with new ideas. In both cases, the variety and volume of drawings in a student's idea log, or visual notebook, count toward the course grade at least as much as the performance of the student's final device. "If all the projects look alike, then it's a bad contest," Flowers tells me later.

One of the habits that Flowers and his instructors try to discourage is a single-minded infatuation with one particular idea. Author and lecturer Edward de Bono has called this habit "vertical" thinking, akin to digging a hole in one place and, not finding what you're after, digging deeper and deeper. Using "lateral" thinking, on the other hand, you climb out and try digging new holes here and there.

The hands-down crowd favorite in this year's contest, something dubbed the Spinmobile, is a product of lateral thinking. Its inventor, junior Annabelle Kim, has taken the course's ethic to heart, and the Spinmobile is the result of her third trip back to the drawing board in the past month. Torque problems and friction torpedoed her first two ideas, a double-ended bulldozer and a two-armed flinger/gatherer. "With my second idea, I could have messed around, cut springs in half and so forth, but I only had two nights to go at that point," she explains to me later, "so I just switched

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my plans and tried to build something really basic."

That something is an ingenious two-wheeled box with short, flexible arms attached at two corners diagonally across from each other. The wheels spin in opposite directions, the box twirls comically, and the two curved arms beat a spectacular barrage of Ping-Pong balls back toward the gutter. Other than its wheels and its motor, the Spinmobile has no moving parts. To standing ovations in round after round, it annihilates tractors and rakes, losing only in the semi-final round—a moral victory for lateral thinking.

Consumer goods for an imaginary planet

Despite their different styles, Bob McKim's course and Woodie Flowers' course share a common ancestry as well as a common purpose. The spiritual father of both was an engineering professor named John Arnold. Arnold ran a program in creative engineering at MIT in the 1950s before leaving to start up the design program at Stanford. Arnold wasn't a self-proclaimed visual thinker, but he was an enthusiastic advocate of yanking students out of the familiar and forcing them into the strange. To this end, Arnold announced the discovery of an imaginary planet called Arcturus IV (there is a real star named Arcturus), where the gravity was 11 times greater than Earth's, the crops grew upside down, and the inhabitants had three eyes and fragile bones.

Students were asked to design consumer goods for this world. Arcturan power tools, for example, ended up being cable-driven, their motors on the ground; a conventional drill weighing four pounds on Earth would have weighed 44 on Arcturus IV, too heavy for a native's delicate arm to support. Other students designed egg-shaped cars and stereo viewers for three-eyed heads. In both his classes and his seminars for visiting engineers, Arnold avoided criticizing even the craziest-sounding suggestions. "It's easier to tone down a wild idea," he told *Life* magazine in 1955, "than to tone up a dull one." His students went on to design new products for such companies as General Motors, Corning Glass and General Electric.

Arnold's idea of using outer space as a way to cut students off Earthly stereotypes was picked up and embellished by Ed Zagorski, a professor of industrial design at the University of Illinois at Urbana-Champaign. In 1961, following NASA's first manned flight, Zagorski dreamed up what has become a classic design problem in engineering schools around the country: the egg drop. The idea was to simulate suborbital flight, substituting a raw egg for Alan Shepard. Students built containers that could be launched 200 feet into the air by a truck-spring catapult and deposited in the campus reflecting pool—without breaking the egg inside. One student cushioned his egg in a container stuffed with peat moss and gelatin, then used a firecracker to pop open a parachute in midflight. Once the capsule was safely afloat, an aspirin tablet holding apart two electrical contacts dissolved, and a tiny electric motor powered the craft ashore.

"Now that was pizzazz," Zagorski recalls. Zagorski doesn't look like a grand old man of creative industrial design. At 63, he's as athletic as a 40-year-old, as imaginative as a child of five. He still teaches what he calls fun and games to first-year industrial design majors.

Zagorski stresses ideas, not technique. He recently asked a class to make something that answered the question: What is a million? One student spent several days popping popcorn, then filled a 32-cubic-foot box with it. Another read a poem on eternity by James Joyce. "It did feel like an eternity," Zagorski admits. A third built a cardboard cube 18 inches on a side with the tips of four corners cut away to reveal clear plastic containers of sewing pins. To complete the illusion, a cinderblock hidden at the cube's center gave the box the proper heft. "To get students to create something original," Zagorski says, "you've got to force them out of the familiar."

A flurry of books and courses have extended visual thinking beyond the classroom, popularizing the idea of left-brain, right-brain duality—the left side said to be verbal and analytical, the right side intuitive and visual. The phrase, "making the familiar strange," in fact, was coined by a business consultant, an impatient, gravel-voiced man named William Gor-

At MIT, Woodie Flowers makes tower of computer cards and staples, strong enough to hold up a brick.

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At Charlestown High, Robin Graves (center), Bruce McIntosh (with beard) gather students, assemblages.

don. As head of SES Associates in Cambridge, Massachusetts, Gordon runs seminars that teach business people to be more creative by making connections between seemingly unrelated images. "The basis of creativity has always been a new connection," he says. "To make connections would take hours using words. Your subconscious has to use pictures."

Gordon believes that an inventor's flash of insight is actually a connection drawn between two images. This process, he says, can be studied and practiced instead of being left to chance. The process is illustrated by one of his inventions, Pringle's potato chips. When a potato chip manufacturer came to him with a problem—how to ship their product in a more cost-effective way—Gordon and his colleagues tried to think of natural analogies. Someone recommended raking leaves: how bulky they were when dry, but how neatly they layered and stacked when moist and all one shape. This led to the answer—making chips of uniform size and shape, so they could be stacked in cans.

There are a number of other business-consulting firms that preach the virtues of visual thinking, and one of the most successful is Synectics Inc., headed by Gordon's former partner, George Prince. Its seminars have helped General Electric improve their dishwashers, assisted NASA in coming up with thermometers for astronauts, and guided Colgate-Palmolive staff members in designing new tennis shoes.

To generate new ideas, Prince, like Gordon, encourages those who attend his seminars to think visually, conjuring up mental pictures and letting them lead rapidly to new visual associations. To help people keep track of their thoughts, the conference room walls in Synectics' earth-toned Cambridge headquarters are lined with two-by-three-foot sketch pads, and jars of felt-tipped colored markers are everywhere.

"What I like," says Prince, a soft-spoken, avuncular man in his 60s, "is to take an accident and make it a process." Sometimes during a seminar Prince smears a bottle's worth of ketchup on a piece of newsprint, then hangs the sheet on a wall and asks everyone in the room to write down what they see. These imaginings are then slowly read aloud as the group continues to write. "Some excursions are more productive than others," says Prince, "but once you get a group going, almost anything works."

The shock of seeing George Prince smear ketchup on a piece of paper, often with his foot, is no doubt heightened by the plush surroundings. At Boston's Charlestown High School, on the other hand, a little spilled ketchup would be unlikely to draw much attention. There, in a sticky-floored classroom overlooking a boarded-up housing project, design teacher Bruce McIntosh (above) is borrowing the techniques of visual thinking to stimulate the imaginations of inner-city high school children.

"If you tell students to build a chair out of cardboard," says McIntosh, "they all build things with flat surfaces and four legs. So you don't say 'chair,' you say

The instructors demonstrate both confidence in and comfort of "sitting machines" made only of cardboard.

Business consultant William Gordon holds stack of potato chips his firm redesigned from image of leaves.

'sitting machine.'" To forestall the usual knee-jerk objection that cardboard isn't for sitting, McIntosh and fellow teacher Robin Graves lead up to the project in a roundabout way. First, they have each student support a ruler an inch above a desk using a piece of paper. Then three rulers. "You get a kid who realizes he can hold four books up with just a piece of paper, and it just blows him away," McIntosh says.

McIntosh, an exuberant, nonstop talker, is an expert at envisioning strange uses for familiar things. Where most people see junk, he sees exciting raw material for his class—perforated sheets of plastic, multicolored foam pads, heavy-duty cardboard tubing. "We're making amazing stuff out of things people have already thrown away," he says. His inverted perspective is clearly rubbing off on his students: on a back wall is a collage depicting a dancing Ricardo Montalban with an oversize digital watch for a belt, two bare arms for legs, and a sneaker for a cigar. Somehow the composition works perfectly.

McIntosh and Graves worry that by the high school years a child's natural willingness to imagine and invent is fading, replaced by a desire to avoid mistakes and find the right answer. "Younger kids have a lot more flexibility," McIntosh says. "They don't know that something won't work, or that they can't draw, or that dogs can't fly."

To back up this last claim, McIntosh refers me to a book that Edward de Bono once published containing children's drawings of dog-exercising machines: remote-control airplanes carrying long leashes; treadmills with films of rabbits projected at one end; magnetic bones that are shot from catapults and return like boomerangs, the dog presumably racing back and forth underneath. De Bono wrote, "Children are not really searching for the best way of doing something. . . . It is enough if the ideas fit together."

Young children do indeed seem to have active visual imaginations, and with practice, children might be able to hang on to this ability to experience the world visually, instead of losing their visual skills as they develop verbal ones. That, at any rate, is what a 29-year-old Stanford graduate student and confirmed visual thinker named Scott Kim believes. Kim is the

Inverted picture of inverted Scott Kim displays his name. Turn picture upside down to see his book's title.

author of *Inversions*, a book filled with words that can be flipped or rotated and still say the same thing—or something significantly different. Its cover, for example, reads "Inversions" right side up and "Scott Kim" upside down.

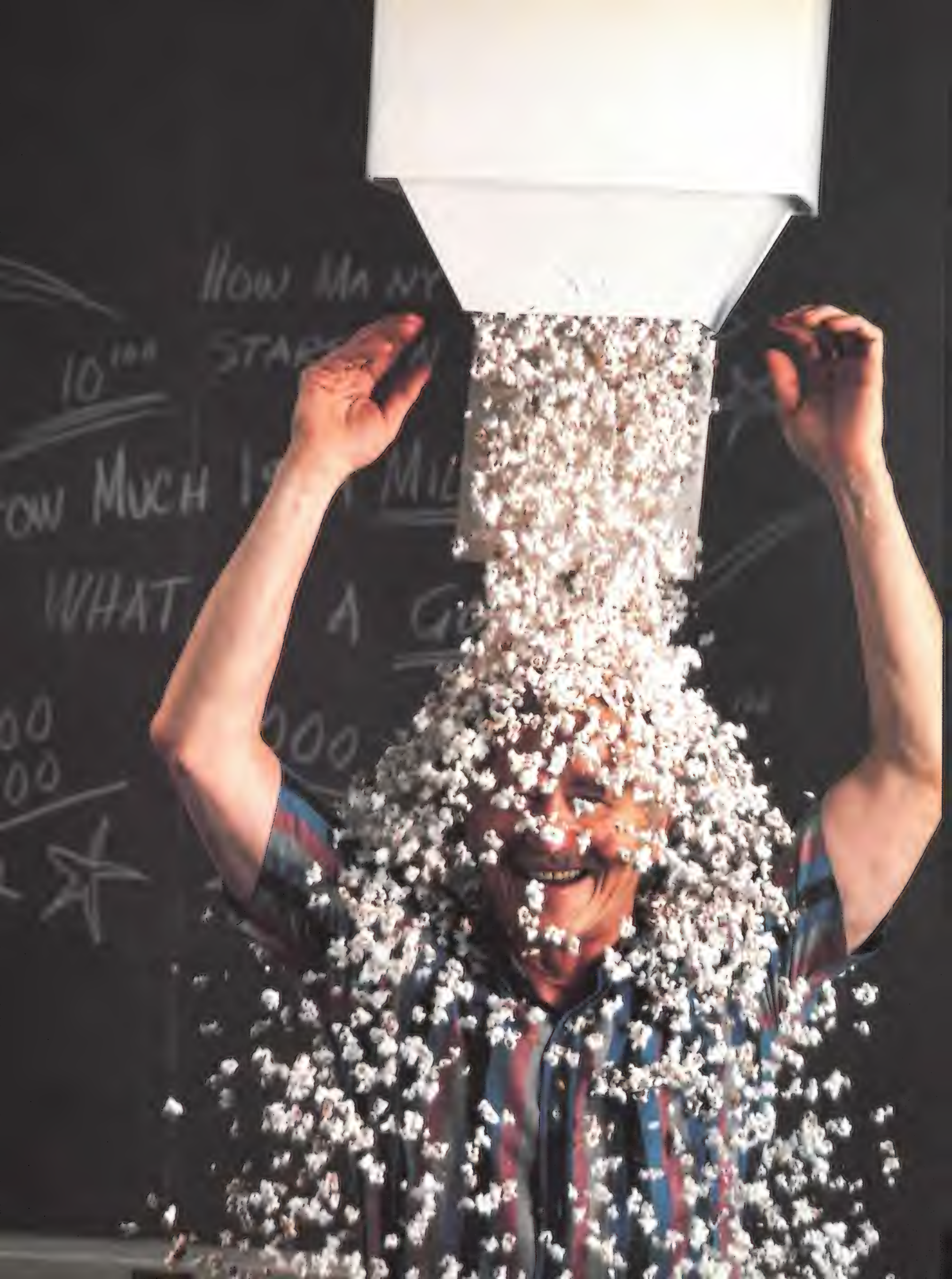
"A lot of my biggest fans are five and six years old, just when they're learning to read," Kim tells me over breakfast one morning at a café near the Stanford campus. To children that age, Kim points out, a letter is still a shape, not a label, so even the familiar is probably a trifle strange. Kim has written an activity guide for schools called "Thinking Upside Down" that shows children how to try their own inversions, and he has put together a software tutorial for making inversions with a computer.

Like many other visual thinkers, Kim wouldn't leave home without a sketch pad. While we talk, he sketches constantly, jotting down words surrounded by boxes, arrows and dotted lines. When he has trouble expressing himself to me, he frowns, waves both hands in the air between us, palms flat as though he were erasing a blackboard, and then starts again.

"The way I understand something is to reinvent it," Kim says. "I put myself in the inventor's shoes. The thing I want to understand now is computers." Kim's own PhD work focuses on how people might interact with computers using pictures instead of words. Kim is excited about computers like the Macintosh that let people choose pictorial commands and make free-hand drawings using a hand-held electronic mouse. "Words are dominant over pictures in academic and serious circles because they're easier to produce," he says, "but computers like the Mac are changing that. To me, computers are the answer to getting visual thinking recognized."

Perhaps creative people have always recognized it, and the rest of us are only now beginning to notice. I recall asking Stanford's Bob McKim how he went about dreaming up his own inventions, most of them highly technical medical devices. "I set myself up for having accidents," he told me. Everyone has accidents, he pointed out, but visual thinkers don't just run off and get a mop. They study the result. "An architect friend of mine was once making a cardboard model of a seaside home," McKim said. "By accident, he knocked the model over so it rested partly on its roof." As a result, somewhere in the vicinity of Monterey, California, there is a homeowner who probably loves the way his beach house looks but who has no idea that it's actually upside down.

Ed Zagorski showers in popcorn a student popped over several days to answer question: "What is a million?"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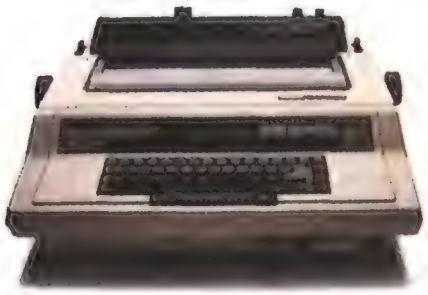

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By Drake Hokanson

To cross America, early motorists took a long detour

The first transcontinental auto route was a 3,389-mile hodgepodge of bumpy roads that daunted tourists but seldom bored them

It was called the Lincoln Highway and in the early 1900s much of it seemed as rough-hewn as its namesake.

In an American summer around 1910, Henry Joy, president of the Packard Motor Car Company, set off from Michigan on a cross-country auto trip. Reaching Omaha, he sought out the local Packard dealer for directions to the road west.

"There isn't any," he was told.

"Then how do I go?" asked Joy.

"Follow me and I'll show you." They drove until they came to a wire fence. "Just take down the fence and drive on, and when you come to the next fence, take that down and go on again."

"A little farther," Joy later recalled, "and there were no fences, no fields, nothing but two ruts across the prairie."

In 1913, Joy became the first president of the Lincoln Highway Association. Like him, the other founders of the Detroit-based organization were closely tied to the infant automobile industry. They understood that a key to the success of the motorcar lay not only in its advancing technology, but also in better roads. Accordingly, they pledged themselves to "promote and procure the establishment of a continuous improved highway from the Atlantic to the Pacific, open to lawful traffic of all descriptions, without toll charges and to be of concrete wherever practicable. This highway is to be known, in memory of Abraham Lincoln, as 'The Lincoln Highway.' "

A half-century later, when I was a kid in the back seat of the family Ford, I had no inkling of what Joy must have endured in Nebraska as we traveled westward from Omaha. The pavement of U.S. 30 was wide and smooth, allowing an easy 60 miles per hour. We slowed for towns along the way and I pressed my face against the glass to get a better view of cafés, grain elevators, mom-and-pop motels and gas stations. In the country, I looked for Burma Shave signs and license plates from as many states as I could find.

I passed into adulthood before I learned that U.S. 30, formerly known as the Lincoln Highway, was the nation's first transcontinental thoroughfare, and that in the early years of the automobile it had captured the imagination of a new class of American: the motoring public. Occasionally, on my jaunts around the Midwest, I would run across old portions of the highway, usually parallel to and not far from the newer four-lane sections. The Burma Shave signs were gone, but I found narrow truss bridges over streams where kids went fishing, and roadside cafés and diners with signs that commanded the motorist to "EAT." I also found some relics of the days when cars had side curtains and highways had names instead of numbers: a tiny gas station with tall, glass-topped pumps, weedy tourist camps with cabins barely large enough for a bed and washstand, and several short stretches of old-fashioned brick paving.

In the past few years I have explored the Lincoln Highway from coast to coast, traveling some sections several times, taking photographs, making notes, talking with people along the way, eating in little cafés and camping in pastures. I have seen the rise and fall

Ruts near a pony express station in Nevada were photographed in 1915 by highway booster Henry Joy.

of the land, the rivers, farms and mountains, the places where trees shade the traveler, and the places where the sun burns the landscape dry. I have also seen a history of road travel in America. This summer, millions of vacationers are once again on the move but many of today's travelers are mainly interested in how long it takes them to drive from one place to another on the interstate. In our rush to "get there" we've forgotten about "the going." We've lost the splendid sense of discovery and adventure that was once what travel on the Lincoln Highway was all about.

In the beginning, the highway afforded its patrons more adventure than many of them had bargained for. On paper, it looked pretty good. The association's first mapmakers drew it as a thick, black line across the country's midsection. In reality, however, it was a poorly marked assortment of existing roads, full of doglegs and detours, stretching 3,389 miles and lacking all but the most casual maintenance and conveniences. The official starting point was Times Square in New York City. The route passed through Philadelphia and Pittsburgh, crossed northern Ohio and Indiana, and angled around Chicago to the south and west. It crossed the plains states of Illinois, Iowa and Nebraska, passed through Cheyenne and Salt Lake City. It wound its way through the deserts and mountains of Utah and Nevada and entered California through Donner Pass. It ended at the Pacific Ocean in San Francisco's Lincoln Park.

Emily Post, America's arbiter of manners and an early automobile traveler, sought advice from friends in 1915 about the best route for an upcoming trip to California. She was told that the Lincoln Highway was "an imaginary line like the equator!" Even the association's own guidebooks pointedly warned that "A journey from the Atlantic to the Pacific by motor car is still something of a sporting proposition. . . . You must cheerfully put up with some unpleasantness, as you would on a shooting trip into the Maine woods, for example. Yet there are no hardships nor experiences which make the trip one of undue severity, even to a woman."

In all likelihood, only a few hundred people had struggled across the continent by auto before the Lincoln Highway came to be. But as the association's maps and other promotional literature began reaching eager motorists, the notion of adventure on the open road began to take hold. A man living in an old pony express station along the highway in Utah recorded only 52 automobiles passing his door during June of 1913. Two years later, his count for the month was 225.

Many of those intrepid souls viewed the West with a mixture of awe and horror not unlike that experienced by the wagon-train pioneers several decades earlier. James Montgomery Flagg, an illustrator from New York City, described part of his trip this way: "It was a scenic railway of a road, sun-baked humps and gullies and loose gravel. A few miles this side of Rock Springs (Wyoming) at sunset we passed gigantic apricot-colored buttes that looked like Egyptian gods and

sphinxes, with the setting sun dyeing their heads rose color. A winding road at the edge of a deep, rushing dark blue river at the base of these marvelous apricot monuments and a few campers in a grove of lush green cedars. It might have been a scene in the Holy Land."

It must have been something to experience that world from the high seat of an open touring car, absorbing the local color at a sedate 20 miles per hour. The tourists met strangers at every turn as they asked directions, sought repairs or bargained with a nearby farmer to pull a stuck auto from the mud. Occasionally, when making auto repairs far from civilization, they looked up to see the Overland Limited effortlessly steaming past them on the Union Pacific's tracks nearby. At other times, a few early travelers found themselves on the tracks, driving the embankment to avoid washouts or streams in flood.

Effie Gladding, a wealthy Easterner who traveled the Lincoln Highway with her husband in 1914, was impressed by the beauty of the land but disturbed by the number of coatless men she saw in the presence of ladies, and by the ugly expression "You bet!" which she heard frequently west of the Mississippi. Emily Post found the highway in Illinois little better than the imaginary line her friend had described, and she nearly abandoned her trip there because of bottomless mud.

But the Lincoln Highway Association was hard at work to realize its dream of a road that was paved from coast to coast. The job was not an easy one because the federal government had not yet created a national highway program and there was no coordination among states or counties as to how improvement money was to be spent. First, the association arranged for the construction of several "seedling miles" in four states. Built with donated cement and local labor, these short stretches were located in areas where the road was the worst in order to demonstrate the feasibility of the new paving material called concrete. Later, the association concentrated on fixing up most of the highway's other rough sections and worked with states and localities to eliminate many railroad crossings. State and federal tax dollars and association contributions built embankments and parts of the road were widened. Gradually, as more and more of the route was straightened, its overall length became shorter and shorter.

As the Lincoln improved and grew ever more popular, other highways began to proliferate. By 1922, there were five additional true transcontinental routes and hundreds of shorter roads. Among them were the Horace Greeley Memorial Highway in New England (it never went near the West), the Alfalfa Trail in Nebraska, the Short Cut West Highway between Madison, Wisconsin, and Belle Fourche, South Dakota, and the never-to-be-forgotten BVD Trail in Iowa. But the Lincoln stood head and shoulders above the rest and it wasn't long before it caught the attention of people with ideas for something other than a leisurely tour.

On July 14, 1925, Louis B. Miller left New York City in a new Wills Sainte Claire Six Roadster. With him

Drake Hokanson teaches journalism at the University of Iowa and is completing a book about the highway he knows so well.

On Lincoln Highway in 1915, Henry Joy paused at a sign calling road to Laramie, Wyoming, "all right."

Highway near Ames, Iowa, was not all right after heavy rains, as one determined Ford owner learned.

was his mechanic, C. I. Hansen. They arrived in San Francisco four days and seven hours later, breaking a transcontinental auto record of four years' standing, and coming within six hours of the fastest scheduled train. During the trip, the pair subsisted only on oranges, ice cream and black coffee. They carried ice water in Thermos bottles, which Hansen dumped down the neck of the often sleepy Miller, who drove the entire distance.

The automobile was a major force in American life by then, and efforts were finally under way to create a system of all-weather roads for the entire country. Although motorists welcomed the improvements, they faced an increasingly vexing problem. Many major intersections featured dismaying forests of signs, arrows and markers promoting this or that named route. Telephone poles resembled totem poles. In the growing traffic of the 1920s, stopping to read the guidebook and decipher the signs was becoming a hazard.

The solution, implemented over loud protests from the Lincoln Highway Association and other promotional organizations, was a national numbering plan for federal highways. With minor changes and the addition of the interstate system, it is still in effect today. East-west routes were given even numbers, with major transcontinentals becoming 10, 20, 30 and so on; north-south routes were given odd numbers. The Lincoln Highway became U.S. 30 between Philadelphia and eastern Utah, and a collection of other numbers elsewhere. What a numbering system lacked in sentiment, it more than made up for in logic and ease of use.

The Lincoln Highway Association cut back operations in 1928. With the exception of a few remaining bad spots in the West, its work was finished. People were taking to the roads as never before and they had nearly 60,000 miles of taxpayer-built pavement to travel on, more than double what was available in 1921. Although the association had been maintaining markers and signs, these were removed to make way for the new numbering system. The group's final act was to arrange for the permanent marking of the highway as a memorial to Lincoln. As a parting publicity shot, 3,000 concrete markers were erected from coast to coast on the same day, September 1, 1928, when Boy Scouts all across the country set them at prearranged locations.

For the span of a few years, those markers, almost one per mile, remained in place. Then, one by one, they disappeared in road-widening projects and rerouting schemes. Today, a half-century later, perhaps fewer than a dozen occupy their original sites.

I discovered several markers in eastern Nebraska one day. From an old map, I knew that the earliest route once took the Lincoln Highway along the Union

Bridge commemorating the Lincoln Highway has been preserved near Tama, Iowa. It was built in 1915.

The Maid Rite Cafe, situated on highway in Belle Plaine, Iowa, since 1920, is still in business today.

Pacific tracks into the town of Elkhorn. Upon turning off a busy four-lane highway near there, I was astonished to find a perfect remnant of a 1920 brick-paved road. A local historical group had worked to preserve it, setting the markers along the way. My car sounded like an old Packard as it rumbled over the bricks. I drove among trees and dense undergrowth, between gentle fields and marsh. Henry Joy would have considered it a superhighway and there I was marveling at its narrow simplicity. I stopped the car to take a closer look, not bothering to pull off to the side. I imagined local farm boys sitting on the fence years ago. They likely would have passed many a quiet summer afternoon calling out the states on license plates as the cars went by. It was hard to believe that Elkhorn's forgotten bit of uneven road could ever have been part of the most important highway in the country.

Some 1,300 miles to the east, in Pennsylvania, the old Lincoln Highway is still a major route—three to four lanes of oil-stained pavement, where heavy traffic often flows without interruption. Traveling that stretch recently, I saw a bumper sticker that said: "I survived Highway 30." This has been a busy path of commerce for nearly 200 years. Between Philadelphia and Lancaster, U.S. 30 follows the route of the first major improved road in the country: the Lancaster Pike. Even in 1794, the year of its completion, the toll road saw heavy use by horsemen, carriages and especially by the giant freight-hauling Conestoga wagons, moving goods to the West. I noticed an original stone marker in the neatly tended yard of a newer home not far from Lancaster. Chiseled into it were the distances: "51 M. to P., 11 to L."

Now, everybody goes to the motels

Mrs. Joseph DeHart lives along this busy road near Lancaster. The day I met her I had been stalled in traffic in front of her house. I saw her self-service flower stand (25 cents a bunch) and a neon sign advertising tourist rooms, and so I quickly pulled over. To one side of her large old home is a doughnut shop, on the other side, a fast-hamburger place. Her iron fence surrounds a pleasant yard filled with trees, flowers and shrubs. After my loud knocking brought no one to the front door, I found Mrs. DeHart behind the garage tending a huge flower garden. She told me that she hasn't taken any tourists in quite a few years but back in the old days the house was often full, as were many other tourist homes up and down the road. Now, everybody goes to the motels. As we talked she busily cut and arranged flowers, and made several trips to the stand in front. As quickly as she put out her bouquets, they disappeared and the cash box (make your own change) began to fill.

Raymond Sipe isn't so busy. The graying, lifelong mechanic has time now and then to sit and watch the traffic on U.S. 30 pass his gas station in Oceola, Ohio. Because Sipe's station is an old Methodist church with tall windows, travelers often do a double take as they pass. "It's the only gas station I know of with a graveyard," Sipe told me. As I stood around with a soda and a candy bar, I observed that the car hoist wasn't too far from where the altar must have been. Raymond and his wife Anna have been in business there since 1945. While his son Dale worked on an Olds, Raymond sat and kept an eye on the westbound trucks.

Belle Plaine took to the automobile

I've discovered that the states of Illinois, Iowa and Nebraska are the best hunting grounds for vestiges of the old highway. Still to be found there are long stretches of narrow pavement. Belle Plaine, Iowa, was on the route until 1936, when the highway was moved several miles north. Originally a railroad town, it took to the automobile and the business it brought. As early as 1916 Belle Plaine boasted three garages and three hotels, including the Herring, which claimed to be "The Swellest Little Hotel on the Lincoln Highway." Supermarkets and pizza places have sprouted up along the road, but surviving landmarks include the Lincoln Cafe, the Iowa Hotel, the Maid Rite Cafe, George Preston's gas station and the E. L. Sankot Garage. The Herring has turned into an apartment house, and the tourist camp at the edge of town is now a pasture.

It's hard to be a stranger for very long at the Maid Rite Cafe. There are no booths or tables, and the stools around the horseshoe-shaped counter make it seem like everyone is at one big table. Farmers and businessmen come in for coffee or breakfast, talk about crops, weather, friends and neighbors. A question or two about the Lincoln Highway touches off a debate about when the road was paved, who first operated the tourist camp, and just when the state will get around to fixing the old highway west of town. The cherry pie at the Maid Rite is made with real lard crust.

The westbound Lincoln Highway tourist of 1925 left the hard pavement for roads of uncertainty near Clinton, Iowa. Hotels and garages were few, and travelers were advised to carry bedrolls, foodstuffs and extra water.

The Great Salt Lake Desert stood as a barrier no less formidable than the high peaks of the Sierra Nevada. Midway between Salt Lake City and Ely, Nevada, was the bleak "desert section," 150 punishing miles across the uninhabited basin of western Utah. For the most part, the early traveler found this part of the road unchanged from its days as the pony express route. The rough path followed the terrain without benefit of

Old-fashioned paving bricks and marker distinguish a stretch of original road near Elkhorn, Nebraska.

Outside of Lancaster, Pennsylvania, Mrs. Joseph DeHart sells cut flowers at her home on the highway.

grading or paving, crossed the usually dry ravines without the assistance of bridges and passed the ruins of the pony express stations one by one. Ironically, the greatest hazard to travel in this arid country was water. A cloudburst could quickly turn the road to alkali mud and the arroyos to raging torrents.

Heading west out of Salt Lake City not long ago, I watched the road dwindle from a busy four-lane to a quiet two-lane. At Tooele, I stopped to top off the gas tank, buy a few groceries and fill my extra water containers. With 20 gallons, I wouldn't soon die of thirst if the car broke down.

Beyond Tooele, the condition of the road was not much better than it had been in the old days. I drove slowly, watching the odometer creep toward 96,000 miles. I began to speculate about the funny noises made by a car with that many miles, and I wondered which of them would lead to something serious, and when. Then I thought of James Montgomery Flagg and his own desert crossing back in 1925: "Thunder storms with grey green clouds filled the sky ahead, making a picture of Purgatory for even the most exacting. A few drops fell on us once in a while when the sun was scorching overhead. All I can say is I was vastly pleased to get across that nightmare. The mere recollection of it makes me so thirsty that I have to stop and get several glasses of ice water!"

Broiling in my own nonair-conditioned car, I polished off a two-quart canteen in short order. As I stopped to refill it from my water jug, a car pulled alongside and the driver asked if everything was all right. I replied that it was and thanked him for his concern. He waved and drove off. His was one of the very few vehicles I saw until I reached Nevada.

An eerie feeling in the desert

Because the original Great Salt Lake Desert trail was bypassed long ago by a better route through Wendover, and because the area is so remote, that part of the Lincoln Highway has probably seen less change than any other section. As I drove along it I had the eerie feeling that I was reenacting the experiences of earlier adventurers. I passed many of the same pony express stations, drove in the same ruts as my predecessors and even worried about the same things they did. My respect for them increased when I realized that they had suffered bad roads all the way to California; I would be back on the pavement in 50 miles.

The Lincoln Highway began and ended on the coasts of America but near the very middle of the continent, in western Nebraska, is a place that signifies it best for me. Four miles outside the town of Brule, in the valley of the South Platte River, is a rise known as California Hill. Late one summer afternoon I stopped by to take pictures from that vantage point and then, seated on my camera case in the warm sun, I pondered the scene spread out before me.

The valley of the Platte has been a dense corridor of cross-country traffic for a long time. During the great westward migrations of the 19th century, thousands of wagons followed this route; so did the pony express, telegraph, Union Pacific, and then the Lincoln Highway. The Highway has long since been surpassed by yet other paths. The four lanes of Interstate 80 to the south of the river hum with the constant whine of trucks, cars and campers. High overhead, thick contrails mark the passage of jetliners that span the conti-

Bypassed by an interstate in the 1960s, a portion of Lincoln Highway in Wyoming now sprouts weeds.

nent in less time than it may have taken Henry Joy to find his way out of Omaha.

Sitting on the hill that day, I wondered if all of those other people who were in such a hurry to "get there" had any idea of what they were missing. If it was restlessness and the desire for a better way to get across the continent that brought the Lincoln Highway into existence, it was curiosity that kept it alive—the notion that the point of traveling was not just to cover the distance but to savor the texture of life along the way. Maybe we've lost that, but the opportunity to rediscover it is still out there waiting for us anytime we feel like turning off an exit ramp.

As I started down California Hill heading back to my car parked along U.S. 30, I recalled the advice of New Yorker Beatrice Massey, who traveled the Lincoln Highway in 1919: "Unless you really love to motor, take the Overland Limited. If you want to see your country, to get a little of the self-centered, self-satisfied Eastern hide rubbed off, to absorb a little of the fifty-seven (thousand) varieties of people and customs, and the alert, open-hearted, big atmosphere of the West, then try a motor trip [on the Lincoln Highway]. You will get tired, and your bones will cry aloud for a rest cure; but I promise you one thing—you will never be *bored*!"

Modern highways are fast and easy but the Lincoln imbued travel with a sense of discovery and adventure.

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To work on historic panoramas, painters often had to use tall scaffolds that moved on circular tracks.

By Robert Wernick

Getting a glimpse of history from a grandstand seat

The famous old cycloramas, many still going strong, brilliantly turned great battles and beautiful scenery into theater-in-the-round

Laid out flat on the ground, any one of them would stretch the length of a football field. Weighing as much as four tons, they are the heaviest works of art ever put on canvas. They are the panorama paintings—in America we call them cycloramas—which for more than a century ranked among the wonders of the world. There were hundreds of them, constantly traveling (it took three wagons and 30 horses to move just one of them) between all the great cities of Europe and America. Each city had special buildings for them, some with columns and pediments and statuary like Greek temples. Almost nothing is left of them now.

Only about 20 panorama paintings have come limping down to the present day, tattered and dirty from decades of neglect. Three in the United States have been restored to their former glory. The *Battle of Gettysburg* (pp. 75-77) is housed in a circular structure in the middle of the battlefield. Hanging in a downtown park, the *Battle of Atlanta* (pp. 71-74) is now, thanks to master conservator Gustav Berger, one of the cultural monuments of the city. And then there is the *Palace and Gardens of Versailles*, stored away for many

years in the attic of the old Senate House in Kingston, New York. Restored by Berger, it has its own special gallery at the Metropolitan Museum of Art.

The panorama painting was born in the late 18th century, the culmination of a search that had begun with prehistoric cave painters to create a convincing illusion of three-dimensional reality on a wall surface. Greco-Roman artists had perfected some famous tricks, like the grapes which the painter Zeuxis got some dimwitted birds to peck at. But the principles of perspective were not clearly understood until the Renaissance, and it was only then that illusionist effects came into their own. The walls of palaces were decorated with trompe l'oeil stairs that invited you to walk up them and chambermaids asking to be pinched. Vistas were painted on walls at the ends of gardens so visitors might get the impression they could see for miles into open country.

A "picture without boundaries"

One day in the 1780s, an Irishman named Robert Barker got the idea of monopolizing the field of vision with a "picture without boundaries," a landscape that would surround the viewer completely and sweep him up into itself. Accounts differ as to how this inspiration came to him: from observing the light streaming onto the walls of his cell in debtors' prison, or from standing under an umbrella on top of a hill and suddenly making a 360-degree turn. At all events, he had the idea patented in 1787.

The idea was to make a huge cylindrical painting of a landscape. The spectator would pop up into the middle of it, walking up a stairway to a circular platform. A railing would keep him from getting too close and seeing that it *was* a painting. A projecting umbrellalike roof over the platform would make sure the only sky he saw was the one in the painting. A fence or wall would make sure he saw nothing below the painting. The effect would be to convince the viewer, at least for a few delighted moments, that he was in some distant place, "as if really on the very spot."

Such paintings would have to be huge—their size was eventually standardized at about 400 feet in circumference and 50 feet in height. They could hardly be done by a single artist: like a movie, a panorama painting was a team effort, with dozens of underlings perched on scaffolding, working with long brushes while a director in the middle barked out commands.

Getting the desired realistic effects presented formidable technical difficulties. It was easy enough to make detailed sketches of a landscape, turning a few degrees for each and then pasting the drawings together. But the drawings were flat and rectangular, the finished painting all curved. In addition, it was soon observed that when you hang heavy canvases like this, nailed to a circle of beams in the roof, they do not hang down straight like theater curtains. Instead, the center portion bellies in as much as a yard, turning the original cylindrical shape into an hourglass one. Straight lines drawn on such a canvas would look curved to spectators on the central platform.

Barker and his collaborators overcame all difficulties, and when his *View of London* opened in 1792, spectators from throughout the city flocked to it. Panoramas became the rage. They spread west to New York and east to Paris, where 13 were once on view simultaneously. They spread all over Europe, to Russia—and even as far as Japan. Many modifications were introduced to increase the realistic effect. Charles Langlois, an officer in Napoleon's armies who specialized in panoramas of Napoleon's battles, perfected the device known as *faux terrain* or diorama, in which three-dimensional objects and human figures are placed in the foreground so as to blend in with the painted surface.

Audiences were enthralled. The Queen of England, viewing the *Russian Fleet at Spithead,* was so affected by the sight of all the water that she declared she was seasick—and so did many other panorama viewers. Later painters, like those who did the French panorama that told the story of *Le Vengeur,* a lone French ship fighting a British fleet, heightened the effect by making the viewing platform pitch and roll as *Le Vengeur* (p. 81) did on the English Channel.

High and low flocked to see the panoramas. They have been called the world's first mass medium of communication. In a time when books and newspapers were expensive, when oil paintings and foreign travel were reserved for the wealthy, they offered richly colored exotic experiences for a few coppers. Think, said one English enthusiast, we can see all the splendors of Pompeii by crossing a street in London without worry about "bad food, unclean beds, bandits and the impudent Italian customs officers."

From atop St. Paul's, 2,000 sketches

Indeed, many of the early panoramas were of faraway places: *View of Pompeii, View of Constantinople, View of Lucknow.* But not everyone was interested. When the American painter John Vanderlyn brought his *Versailles* to New York in 1818 (the one now in the Met), the public refused to pay admission and he went bankrupt. People were more taken with a perfectly familiar landscape, their own hometown, for instance; it tickled them not to be able to tell whether they were indoors or out. The most ambitious of all panoramas was another view of London, this one made by Thomas Hornor in 1823. In the early 1820s, when a major re-

Fold out →

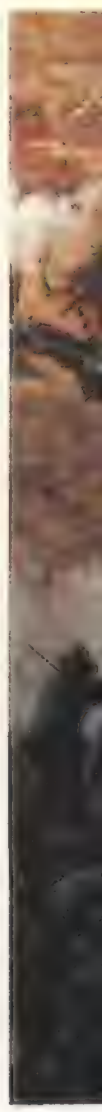
A fish-eye camera lens shows how an audience, sitting on a platform that slowly revolves 360 degrees, watches unfolding details of the *Battle of Atlanta* (next page) as loudspeaker recounts the story.

Presented as a complete circle starting, and ending, where the railroad curved past the red-brick Troup Hurt house (now the corner of Dekalb and Degress Avenues), the *Battle of Atlanta,* with enlarged details below, records a bloody, one-day fight that briefly delayed General Sherman's seizure of the city.

The battle began about noon, July 22, 1864, when forces Gen. John B. Hood sent to get behind the besieging Union lines drove the Yankee left flank past the Troup Hurt house and took up positions along the ridge beyond it, after capturing the Union artillery there. The Union troops rallied and fought back (see Stars and Stripes facing the red flag of the Confederacy), having fired on their own captured battery and killed the horses to immobilize the guns.

The railroad (center) leads to Decatur, Georgia, about five miles away. Well to its left a white-topped ambulance wagon bears the body of Union Gen. Manning Force, shot by Rebel skirmishers at 2:30 P.M. Farther left General Sherman is an all but invisible speck on horseback to left of white house on the distant hill. In the right gatefold Col. James Martin's blue-clad brigade is attacking from the far side—and being hotly counterattacked by the Rebel line that formed on the high ground behind and beyond the Hurt house. Union troops finally retook all their lost ground and the Confederate tactic failed, leaving 8,500 Southern and 3,700 Northern casualties.

In one touching vignette a Yankee soldier finds his Rebel brother dying and gives him a drink of water.



Confederates face counterattack from Union soldiers over the wreckage of horse-drawn Yankee artillery.

Rhett Butler did not fall in the battle, but is a latter-day addition.

Yankee Gen. John Logan gallops forward with staff, urging troops to fill in line broken by Rebel attack.

Plaster figure in foreground adds extra dimension to scene of Union General Lightburn's brigade attacking.

Col. James Martin watching fight for Troup Hurt house on horse repainted white—for greater accuracy.

. . . And at Gettysburg, the most famous charge of the Civil War

This section of the vast Gettysburg panorama re-creates Pickett's Charge, heroic but misguided moment in three-day battle that all but doomed the Confederacy.

At far left Rebels, after advancing nearly a mile over open fields from distant tree line, hit Yankee center —only to be cut to pieces (near the cluster of red flags). In the center foreground Yankee soldiers are herding some captured Southerners back toward the rear. At the far right brave ranks of Confederates are still

advancing under a hail of fire while hand-to-hand fighting goes on in angle formed by intersecting stone walls. When the failed charge was over, nearly 7,000 Confederate soldiers lay dead or wounded. General Pickett survived. He is just visible on a black horse crossing road to right of farmhouses.

Paul Philippoteaux, posed before his Gettysburg panorama in 1884, painted himself in (right) as Yankee.

pair job was being done at St. Paul's Cathedral, Hornor climbed up the scaffolding to the cross on top of the dome, attached a rickety little shed to it and sat there every day from dawn to dusk with a telescope at his eye, making more than 2,000 sketches of the roofs and spires and streets. His painting was housed in an immense building called the Colosseum, with an "ascending room," which was London's first passenger elevator, to lift the viewers up to the level of the view. Owing to Hornor's telescope, it was a better view of London than anyone could have got with the naked eye, and it overawed everyone with its painstaking accuracy despite a few lapses like the two adjacent chimneys blowing smoke in opposite directions.

Panoramas also represented important current events. They were the newsreels of the Napoleonic wars. One year after Nelson's victory in the Battle of the Nile, the Admiral told Barker that the panorama depicting that conflict had kept his triumph alive.

Napoleon, ever the master propagandist, saw a panorama of his victory at Wagram and was quick to recognize the possibilities of this new form. He ordered seven more of his victories to be "panoramized," but he stopped winning battles before the project could be carried out. Waterloo was to be one of the best-loved subjects in the 19th century, exceeded in popularity only by Crucifixion scenes like the 45-by-195-foot vision of Christ on Golgotha now at the Forest Lawn Memorial Park in Glendale, California.

The panorama vogue lasted all through the century. Not all the paintings were of the fixed-cyclorama type. In America a form was developed in which the painting was a huge scroll wound from one spindle onto another like the Torah in synagogues. The scrolls were unwound to give viewers the impression they were seeing the wonders of the American landscape, perhaps from a railroad car—or a Mississippi steamboat. Some were more than three miles long—and if their artistic quality was rarely high, you could see a lot of countryside for your money.

Grandiloquent, popular and profitable

A golden age of the panorama came in the 1870s when the French began flocking to see paintings of the war they had just lost to the Germans. It was hard to find any examples of successful French action, but French panorama painters naturally did, thus helping assuage the scarred and battered national pride. Soon German painters were asking themselves why *they* shouldn't be making some money out of a war which their side had, after all, won. The results were grandiloquent, popular and profitable. The first *Battle of Sedan* was done by a Bavarian artist who outraged Prussian public opinion by showing Bavarian troops

Above, conservators wear "space suits" so they can work in safety scrubbing toxic dust from the Atlanta canvas. At right, panorama hung on circular monorail is hauled past scaffolds for refurbishing.

sweeping the field while the Prussian cavalry was hidden by cannon smoke. A second version duly restored the Prussians to the place of honor, but left out the Crown Prince, who thereupon boycotted the opening ceremonies.

Artists from both the French and German schools were responsible for the two surviving views of major battles on American soil, Gettysburg and Atlanta.

Gettysburg was the work of a Frenchman, Paul Philippoteaux, whose father, Félix, was one of the most successful European panoramists. The cyclorama now at Gettysburg is a copy done in the early 1880s of an original Félix designed and worked on with Paul in Brussels.

The scene represents the climax of the battle, July 3, 1863, "the high water of the Confederacy," when 12,500 men under General Pickett marched in long ranks over open farmland against what they mistakenly thought was the weakened center of the Union lines. There are thousands of soldiers in the painting —fighting, fleeing, dying—and, as in all panorama paintings, their uniforms and formations are rendered in the most precise detail. Inevitably there were some inaccuracies, but the painters knew that many war veterans would be among the visitors, and woe betide the panoramist who got so much as a button wrong.

The artists traveled to the spot to make sketches, but certain liberties could be taken with landscape. Some say the haystacks with which Philippoteaux dotted his Pennsylvania farmland have a Belgian look. Painters also liked to give themselves an inconspicuous part of the heroic scene in lieu of a signature, the way Alfred Hitchcock gave himself small walk-on roles in his films. If you look carefully at Gettysburg, you will find M. Philippoteaux with his flaming red beard under a tree, in the uniform of a Union officer, his battle-nicked saber resting across his knee (opposite).

The *Battle of Atlanta* shows what was going on that afternoon in July 1864 when General Hood made a desperate effort to break Sherman's inexorable progress toward the city. Some local historians maintain that Hood might have delayed things dramatically if a

Robert Wernick, who writes often for SMITHSONIAN *on art as well as history, has discovered in the cyclorama a subject that happily combines the two.*

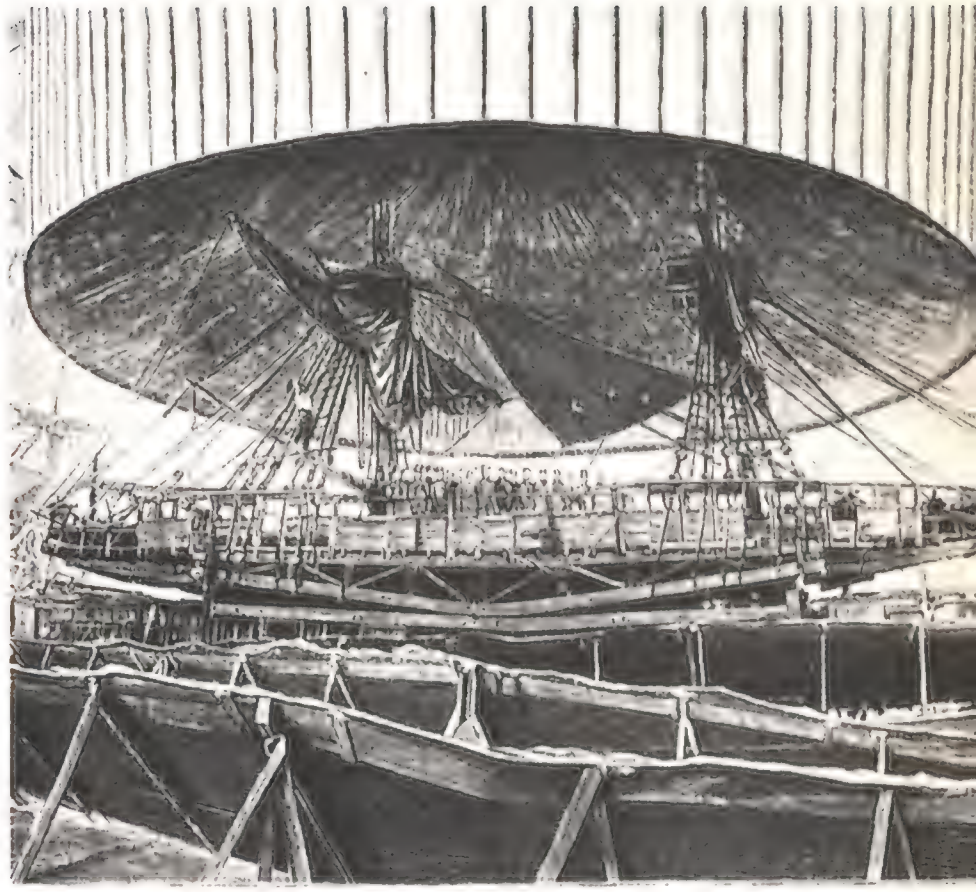
Artists in prolific Milwaukee workshop, circa 1888, use costumed models for figures in religious scenes.

column had just turned left instead of right and then rolled up the Yankee line. As it was, the Confederate attack got as far as the Troup Hurt house on the railway track, overran a Union battery and then faltered. The painting shows the Yankee counterattack getting under way, one wounded general being carried off with Illinois' Gen. John A. Logan riding up on a black stallion to replace him. It is reported that the painting was originally commissioned to promote General Logan's campaign for the Republican Presidential nomination, but he died before the convention.

The work was created by a team of German artists, trained in the academies of Munich and Düsseldorf, who were brought over to Milwaukee in the 1880s—because it would be a congenial place for them among the turnvereins and beer halls of what was then a thoroughly German town. They stayed on for nearly two decades, transforming Milwaukee into a veritable Hollywood of the cyclorama industry, turning out a series of historical and religious paintings which traveled all the cities of the land.

With Teutonic thoroughness they prospected and sketched the scene of the Atlanta battle, which had changed very little in the intervening years. They also used the services of a *Harper's Weekly* war artist who had marched through Georgia with Sherman. There was a separate painter for horses, another for trees, a specialist on Union uniforms, a specialist on Confederate. Where Gettysburg is painted in broad strokes with Gallic bravura, Atlanta is tighter, more carefully, grimly realistic. Both achieve a kind of epic scope, combining a weighty sense of history with a profusion of intimate detail—the dying men and horses; generals on horseback impassively watching the carnage; a Tennessee soldier offering a cup of water to the brother he has found wounded, in enemy uniform, on the field of battle; the bald eagle Old Abe, mascot of the 8th Wisconsin Regiment, spreading its great wings through the blue Georgia sky as it looks down on the predatory behavior of mankind at Atlanta—the 37th battle, so it's said, that Old Abe attended. In fact, Wisconsin's 8th never participated in the battle—they were not even in Atlanta at the time—but were painted in by the Milwaukee artists as a tribute to Wisconsin's Civil War veterans.

Neither painting was intended for the site of the battles. They were moneymaking enterprises, designed to travel from city to city in the North, and they traveled profitably till the day the sky fell in on the panorama business. It was the motion pictures that did it. Once people had seen a cavalry charge, no matter how gray and flickering, on the screen, they were no longer



Nautical viewing platform for French naval battle gently rocked as if spectators were actually at sea.

Cutaway view shows how Robert Barker's design let audiences see two different panoramas in one building.

impressed by the splendid colors and static illusionistic feats of the panorama masters.

Many panoramas simply disappeared. The buildings that housed their great canvases were often torn down or set on fire for the insurance money. In the United States, the only building now thought to stand is the Boston Center for the Arts. Barker's original brick rotunda is part of a church, Notre Dame de France, in London's Soho. The only one to survive of the 13 buildings that once stood in Paris is a theater. A portion of the original structure housing the Bourbaki panorama in Lucerne has been converted to a garage. It is a maverick among panoramas because instead of glorifying war, it shows the defeated French army of General Bourbaki, in rags and misery, being cared for by Red Cross workers in Switzerland at the close of the Franco-Prussian War.

The Gettysburg painting lay rolled up in a box on a vacant lot in Boston for more than eight years, exposed to rain and snow and fires set by naughty boys. It was rescued in 1910 by a merchant from Newark, New Jersey, who cut it into strips and hung it from the balconies in the courtyard of his department store. Now the National Park Service houses it in a handsome building near the site of Pickett's Charge on the battlefield. Although it is splendid to look at, it had suffered terribly over the years, and in the process of restoration lost more than half of its surface. Almost all the sky is gone. So is the *faux terrain*, as you can see if you look carefully at details in the foreground. There is a well, for example, with a pulley for the bucket held up by only two posts of a tripod—the third was a genuine piece of wood which used to lean against the canvas. The painted rope stops short just as it is going through the pulley; once there was a piece of real rope artfully elongating it.

The Atlanta painting had a somewhat less tumultuous life. It was shown in a half-dozen cities, losing a little inevitably at each move as it was scuffed along the edges, or bits of the sky were cut off where the painting was nailed to the circle of beams that held it up. In 1892, the painting was brought to Atlanta for good. Out of consideration for local susceptibilities, a column of Confederate prisoners had their uniforms repainted from gray to blue at that time (they were described as deserters from the Union Army). In 1893, the cyclorama was acquired by a local merchant who bequeathed it to the city, where it had a splendid neoclassical-temple sort of home built expressly for it.

Like all the panorama paintings of the golden age, the *Battle of Atlanta* was a work of the highest technical order, painted on fine Belgian linen in per-

This scroll panorama had to be rolled down. The surrealistic scene was about human fruitfulness.

manent oils with the painstaking techniques taught in 19th-century academies. They were paintings made to endure, and when they have been left alone they have endured under the most difficult conditions. The *View of Jerusalem on the Day of the Crucifixion* has been hanging for almost a century in the shrine of Ste. Anne de Beaupré in Québec, in an unheated building where the temperature can drop below zero in winter and the floor has been flooded by the waters of the St. Lawrence. Yet it is virtually intact today, except for a part destroyed in 1958 when the roof caved in during a snowstorm. Paintings of this size can stretch and contract as much as four feet in a single day because of temperature changes, but because they are stretched in only one direction by the straight-down pull of gravity, they can readjust. If they were stretched *and* restrained laterally as are easel paintings with stretcher bars, the ancient panoramas would have torn themselves to pieces along stress lines years ago.

Well-intentioned efforts at restoration often had disastrous results. One treatment, common in the 1920s, was to soak a painting in linseed oil in order to "nourish it," which made it not only yellow but also too shiny. To dull the shine, the Atlanta cyclorama was coated with buttermilk, which left a thin layer of cheese, forming an almost impenetrable yellow film covering the painting. When a remarkable diorama was made in the 1930s to put in front of the Atlanta painting, an extra touch of realism was achieved by using real Georgia red clay for the battlefield. That brought with it beetles, bacteria and even mice which began eating up the canvas. For protection against such foes, the back of the canvas was covered with a thick compote of arsenic, lead, sulfur and antimony which, whatever it did to the vermin, made an unsafe environment for any human getting too close. Finally, in 1976 a freak storm knocked a hole in the roof and water poured in. The canvas began to fall apart and could be saved only by major restoration. Mayor Maynard Jackson was fascinated by the cyclorama, and knowing it would draw tourists, he helped to raise eight million dollars for a complete repair job.

Under Gustav Berger's direction, the four-year-long restoration was epic, on the scale of the picture. At first it looked as if to get at the painting, which at places hangs only a few inches from the walls of the building, it would be necessary to tear the building down. It was then proposed to cut the painting into strips and lay them out flat on the ground to work on them. But because of the hourglass shape the canvas had assumed, it would have been impossible to sew them together without cutting out large parts of the scenery. Drawing on his education in chemistry, architecture and engineering, as well as art history, Berger came up with a series of elegant solutions, a plan to restore the painting while it was suspended. He transferred it from the beams on which it was nailed to a circular steel monorail. Then he knocked out one wall of the octagonal building and built two work towers, one for inside and one for outside. The restorers could work on the two towers and the painting could be passed between them. Those on the outside had to put on space suits (p. 79) to scrape off the thick poison mixture on the back of the canvas. Two years alone went into patching or mending some 700 rips and tears, matching and touching up the original oil colors, removing that dull coat of buttermilk. The red clay and musty plaster vegetation were replaced with fiberglass substitutes that offer no temptation to mice—or mold. Finally, the back of the canvas was treated with a special flame-retardant adhesive invented by Berger, in order to affix a reinforcing lining.

For a moment you are outdoors

Important as restoration was to Gettysburg and Atlanta, it meant losing a prime ingredient of traditional panorama—natural light coming in through a glass roof. This normally gave a greater sense of reality to the paintings, but when the weather was bad it made it difficult to see them. At both Gettysburg and Atlanta, under artificial light, there is no doubt in the spectator's mind that he is looking at a painting.

Today, to see a panorama that induces you for a moment to believe you are outdoors requires a trip to the Netherlands, to The Hague, where a painting made by Hendrik Willem Mesdag has been hanging for more than a century. Mesdag was a member of a school of 19th-century landscape artists fascinated by the play

Stan Blossom, Sun Company district engineer, with his son, Tony, fishing near Hillhouse oil rig in the Santa Barbara Channel.

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of light on the sand dunes and fishing boats of coastal Holland. He produced a huge number of paintings on these themes, but none has quite the freshness of his panorama, a view of Scheveningen just a few hundred yards from the building where the painting hangs. Visitors come up through a dark womblike tunnel, then suddenly find themselves on a wooden pavilion in the middle of a sand dune (it is wood, really, but covered with a fine layer of sand smelling of the salt sea and strewn with fishnets, boathooks and wooden shoes). Fishing boats are drawn up on the beach, adventurous citizens are out in their bathing machines, a troop of cavalry is maneuvering, the town sits silent in the mixed sunshine and shadow of an approaching storm. It is all so tremendously natural that you need a moment's reflection to realize you can't just climb over the railing and run into the dunes (right).

Despite its popularity, panorama painting was never officially recognized as one of the fine arts; it was too mechanical, too commercial. It is true that Van Gogh, the least commercial of artists, found the Mesdag panorama "faultless." And the panorama did have its champions: Sir Joshua Reynolds admired these dramatic vistas and Ingres brought his students to observe the panorama painters' depiction of nature. But there was no serious place reserved for it in the official histories of art.

Yet today, tourists are flocking to see scenes like the *View of Thun*, at Thun, Switzerland (the oldest survivor, painted in 1814), and the *Crucifixion* at Altötting in Bavaria. There are panoramas in a rotunda in Innsbruck and a café in Salzburg, Austria. The somewhat dilapidated *Battle of Waterloo* at Waterloo, Belgium, has been a popular favorite since the early 1900s. In Australia, where panoramas enjoyed a great vogue in the 19th century, the *View of the Landscape of Central Australia*, showing the Outback in all its savage desolation, was completed by two Dutch painters in Alice Springs in 1975.

Where the Communists are in power, they have realized, like Napoleon, that panoramas offer a fine opportunity for stimulating a taste for the martial arts and old-fashioned patriotism. In Russia, two old Czarist paintings, the *Battle of Sevastopol* in Sevastopol and the *Battle of Borodino* in Moscow, were completely restored as well as handsomely housed during the 1950s and '60s. They are said to attract millions of visitors. A brand-new scene, the *Defense of Leningrad*, celebrating the struggle with Germany in World War II, opened in May.

The East Germans are producing a scene from the 16th-century Peasants' War, presented as a proto-Marxist uprising. The Bulgarians have a *Storming of Pleven*, an episode from the war of liberation against the Turks, done by a team of Russian painters on the lines of a vanished work created by Gettysburg master Paul Philippoteaux. There is also said to be a new panorama in Pyongyang, North Korea.

In Poland, everyone knows about the panorama of the *Battle of Raclawice*. It depicts a victory of the

H. W. Mesdag's realistic view of the Dutch resort of Scheveningen has a three-dimensional foreground.

liberty-loving Poles led by Košciuszko over a Russian army of occupation in 1794, and is both national symbol and treasure. The battle scene was painted in the 1890s by a team under impassioned patriot Jan Styka in Lemberg—then part of Austria but later to revert to its Polish name of Lwów when Poland recovered her independence in 1918. For the next 21 years it was a pilgrimage site. When Lwów was annexed by the Soviet Union in 1939 and became Lvov, patriots risked their lives to take the painting and hide it. After the war, they carried it to Wroclaw (formerly Breslau). Following the advice of Berger, who went to Poland to help, devoted conservators have been repairing the ravages of age and war and well-intentioned attempts at restoration. At last report their work was done. The panorama is scheduled to be opened to the public this summer and Poles, whose political perspectives are somewhat circumscribed these days, will get a chance to pore over a "picture without boundaries," satisfyingly surrounded by their heroic past.

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Ford Tempo. The fo

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Have you driven a Ford... lately?

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ward thinking car.

By Noel Vietmeyer

Science has got its hands on poison ivy, oak and sumac

Researchers have developed a skin test for sensitivity to these weeds, and foresee a vaccine that takes the itch out of them

In the summer of 1977 parched slopes of the Los Padres National Forest near Monterey were torched by lightning. For three weeks the Forest Service battled the flaming brush and trees.

But the Marble Cone Fire eventually spread to cover nearly 280 square miles of mountainsides and the situation became desperate. "We were trying to fight one of the worst fires in memory and we couldn't keep a full crew on the fireline," recalls one forest engineer. "Guys were streaming out of the hills with their eyes running. It was California's second largest wildfire, with high risks of going completely out of control, and almost a third of our men had to leave the line with injuries caused by poison oak!"

Poison ivy is found in most of the United States, the relatively rare poison sumac in the East and poison oak in the West. (There is also a southeastern species of poison oak locally known as Eastern poison oak.) Wherever they occur, these plants are the nightmare of gardeners, the scourge of hikers and the curse of campers. At least 110 million Americans are clinically sensitive to the chemicals they contain; some 23 million are so sensitive that after even brief exposure they require a doctor's care. For millions of Americans these innocent-looking, rather attractive plants have made the outdoors a place of menace. To avoid contact, they have been forced to abandon their gardens, give up on picnics and avoid the summer woods like the plague. Others venture out swathed in protective clothing, as if going off to battle, and on becoming casualties spend day after itchy day smearing their bodies with brown laundry soap or other home remedies. For all of these sufferers relief—at least in part as a result of the Marble Cone Fire—may be in sight.

Unrelated to normal ivy or oak, the plants are members of the cashew family and are related to the cashew itself, the mango, and the lacquer tree of Asia (lacquer is a varnish made from its poison-ivylike sap, which can also cause a rash). Native to the United States, Asia and Central America, these plants are almost unknown in other parts of the world. In the last century, for example, English visitors were amazed at the beautiful fall colors of poison ivy and took some home. Because it is called "ivy," they planted it. Soon thereafter a British medical journal reported a new disease contracted only by women, who did the gardening, and concluded that it was a "hysterical rash."

All parts of the country except Hawaii, Alaska and some of Nevada contain poison ivy or oak or poison sumac. Poison oak is actually one of the most widespread shrubs in California. Deer, cattle, goats and other herbivores browse the nutritious foliage without apparent ill effects, but most humans touch the plants at their peril. And firefighters fear these vines and shrubs more than almost anything else. Breathing smoke from burning poison ivy or poison oak can cause fearsome effects: head-to-toe dermatitis, fever, horrendous lung infections, malaise, and even death when the throat swells shut. Moreover, firefighters cannot avoid the plants. At night, they cannot see them and, besides, firelines must be cut whether or not any patch of vegetation is in the way.

Three plants that should be seen but not touched: poison ivy (top), its relative Pacific poison oak (left) and the relatively rare poison sumac (right).

More trouble than cuts and contusions

Jerry Oltman, a project leader for the Equipment Development Center at Missoula, was not at the 1977 Marble Cone Fire; he lives in Montana 800 miles away. But his office designs and builds equipment for the Forest Service, and he decided that it should do something to avoid a repetition of the doleful experience. "Poison ivy and poison oak cause ten percent of all the Forest Service's lost-time injuries—almost twice as many as cuts, abrasions and contusions combined," he says. "I figured that if we could find a way to reduce these injuries by even a small percentage, it would pay for itself many times over."

Initially he tried to encourage federal agencies and pharmaceutical companies to lead a broad-based effort

Smoke from forest fires, like this one in Cascades, can immerse firefighters in urushiol from poison oak soot.

to develop a skin-patch test kit for sensitivity to the plants as the first step to reduce injuries. None showed any interest. To them, extensive poison ivy research seemed neither a national priority nor a commercially enticing prospect. So Oltman, a forester who has never had a poison ivy outbreak in his life, and who lives in one of the few parts of the country that has none of the poison plants, took on the daunting task himself.

First he approached William Epstein, the nation's most experienced poison oak researcher. A dermatologist at the University of California Medical Center in San Francisco, Epstein is perhaps the only person in the country who speaks enthusiastically about these plants. His exuberance bursts out in lively staccato: "Poison ivy and poison oak are by far the major cause of allergic contact dermatitis in the United States; more people suffer from them than from all other allergic skin diseases combined. . . . No one counts the number of cases, but there are probably at least ten million a year nationwide. Poison oak and poison ivy are possibly the greatest cause of workmen's disability in the nation; each year may bring more than 140,000 cases in the work place, causing perhaps more than 152,000 lost workdays!"

Poison ivy, poison oak and poison sumac all contain a heavy oil called urushiol (pronounced oo-ROO-she-ol). It is clear, gummy, so incredibly reactive that a pinhead amount can cause rashes in 500 sensitive people, and so long-lasting that botanists have received serious dermatitis from plant samples stored away for more than a century. In one reported incident, lacquer from a Chinese jar, which had been buried for about a thousand years, caused dermatitis.

A skin test to measure sensitivity

With a contract from Oltman, Epstein and his colleague Vera Byers developed a test for determining a person's sensitivity to urushiol. "Most people actually don't know how reactive they are because the last time they had a dose was in childhood," notes Epstein. "But the sensitivity changes with time: as some people get older they get less reactive, particularly if they never encounter the plants. It works the other way, too. People used to wading unscathed through patches of the plants can suddenly break out."

The skin test is similar to the one used for detecting TB exposure. A small, standardized drop of dilute urushiol is placed on the arm. Seventy-two hours later, depending on the person's reactivity, there will be nothing, a red spot, a red spot with swelling and itching, or a red spot with blisters. It is simple enough for anyone to do, it comes with a little tube of cortisone gel to take away the rash and the amount of urushiol is so small that the rash will not spread.

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Gloved researchers Sue Watson and Mahmoud ElSohly experiment with poison ivy to find vaccine.

"For the first time we are getting baseline information on just how sensitive people really are," reports Epstein. "Between 15 and 25 percent of us are essentially immune, 25 percent are mildly sensitive and don't normally develop severe reactions, 25 to 30 percent are moderately sensitive and break out significantly with the amount of urushiol found in one leaf, and ten to 20 percent are so exquisitely sensitive that less than one leaf produces intense dermatitis."

Last year the Forest Service used the skin-patch kit to advise its firefighters on their susceptibility. Next year Oltman hopes to have it produced commercially. "One day you might see it in sporting goods stores," Epstein speculates. "People going fishing, hunting or whitewater rafting could find out how sensitive they are before setting out, and companies could identify and provide special protection for workers most likely to suffer massive dermatitis in the woods."

The test kit doesn't help once an exposure has occurred, but advances in conquering the reaction are coming from immunologists. Urushiol, despite the plants' names, is not a poison; it causes an allergic reaction. As with other allergies, people are born without any sensitivity to urushiol. Babies, for instance, rarely get the dermatitis. Between the ages of five and ten, however, most children become sensitized, and from then on their immune system is reactivated whenever they again come in contact with the plants, even if it is 20 years or more later. (It is not known how many exposures will cause the first response, but from then on mere traces will again trigger the reaction.)

Within minutes of contact, the oily urushiol penetrates the outer skin layers and begins chemically binding itself to skin cells. The body sees the combination of an urushiol molecule piggybacking on a skin cell as a foreign intruder. The immune system rushes large white cells called macrophages and T-lymphocytes to destroy the affected skin cells.

"It's the body's own overreaction that causes the complications," explains Epstein. "In sensitized persons the area fills up with the white blood cells and they release so much cell-destroying toxins that they tear apart even the skin itself. That's what produces the blisters and suppurating sores."

However, the fact that urushiol generates an immune response gives researchers a chance to deliberately suppress the body's response. And this has now been accomplished experimentally.

Mahmoud ElSohly, a chemist at the University of Mississippi, has created a "masked" form of urushiol that binds less to the skin. Experiments with guinea pigs show that it can be safely swallowed. When it is absorbed from the digestive tract, the liver strips away the chemical disguise, thereby releasing urushiol into the bloodstream. This causes an entirely different kind of response from the immune system. Sensing the invader, the immune system may manufacture suppressor cells and chemicals, and those that remain in the blood desensitize the person so that upon later contact with poison ivy or poison oak the body's response is muted.

"Urushiol is released where it is effective," explains ElSohly. "We can use fairly large doses, there appear to be few side effects, and the immunity is developed

Weak positive reaction to skin-patch test for poison ivy with redness, blisters, shows moderate sensitivity.

Noel Vietmeyer is a Professional Associate at the National Research Council. He wrote on rare breeds of livestock in the August 1983 SMITHSONIAN.

How a Kansas farm girl became a maven on Peruvian alpaca fashions

The alpaca, cousin to a llama, lives at the 15,000-foot level in the Peruvian Andes. It is an unpleasant beast that spits at people.

But its wool is magnificent. To survive the Peruvian winter, the alpaca grows a tremendously thick coat. So it won't weigh down the animal, the wool has hollow hair shafts. So it won't get wet and matted, the wool has a high lanolin content. Result: alpaca wool is deceptively lightweight, with a deep and silky softness to the touch. Many who have compared them maintain that alpaca is richer than cashmere.

These facts and more are related by Annie Hurlbut, a farm girl from Tonganoxie, Kansas who went to Yale, became an anthropologist, then traveled to Peru to pursue her profession.

This is not Annie Hurlbut. This is another Kansas farm girl who traveled to faraway places.

In Peru she studied "market women" in remote Andean villages. These women practice a centuries-old tradition that predates even the Inca empire: they weave alpaca wool into clothing (historically, ponchos and capes, but today, mostly sweaters).

By U.S. standards, Annie Hurlbut found the styling unsophisticated, but the sweaters had a peasant-like verve and freshness that made a perfect counterpoint to the luxury of the fabric.

This is not Annie Hurlbut. This is a model wearing Annie's gray mufflered cape (100% alpaca, of course), $165 plus $3.75 s&h.

So Annie Hurlbut did what any Kansas farm girl would have done. She restyled the sweaters, set up sources of supply, went back to Tonganoxie and with her mother, Biddy, started a mail order business.

Eight years and 34 buying trips later, their business ("The Peruvian Connection") publishes a 36-page full-color catalog with 172 items.

There are sweaters, skirts, camisoles, capes, blankets, ponchos, mufflers—even tapestries.

This is an alpaca. Its wool has hollow hair shafts and a high lanolin content. It may well be the lightest, softest, most luxurious wool fiber in the world.

Everything in the catalog is made in Peru of native materials. Most designs are original (many are Annie's) and most items are exclusive.

It is the largest selection of its kind in the U.S.

It's a fun catalog to shop. Alpaca wool grows naturally in many colors, from white to beige, brown and gray. It also takes dye quite well, so you'll find not only the earth tones, but also marvelous shades of raisin, periwinkle, peach, sage green and teal blue.

And you'll find breathtaking pictures of the Peruvian highlands, because Annie Hurlbut loves Peru and the Andes mountains.

This is Annie Hurlbut. She is wearing her native Andean padre hat of embroidered wool felt (black, teal blue or taupe), $35 plus $2.90 s&h. (For proper size, measure around head.)

The best part: the catalog is free, as long as supplies last. You can mail the coupon or phone toll-free for a copy.

Annie thinks she's reserved enough catalogs to cover requests from this ad, but it wouldn't hurt to be prompt with *your* request, just in case.

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Bright red leaves of poison ivy in the fall may tempt people to pick them, but it will be at their peril.

quickly." But the procedure is still experimental; clinical trials with humans at Epstein's laboratory in California as well as in Pennsylvania have not yet shown the effectiveness of this vaccine at safe doses.

Epstein and his colleague Vera Byers are developing their own poison ivy vaccine in a related way. They use a modified form of urushiol that is unreactive on skin (and so doesn't have to be chemically masked), but that creates an immune response when small amounts are swallowed. "It desensitizes animals," noted Byers. "Now we're preparing to try it in humans."

Poison ivy pills that immunize adults for a year and children for the rest of their lives might seem like the ultimate solution, but there is also hope for other forms of relief against the plants.

For instance, a scientific team at the Oregon Health Sciences University in Portland has developed a set of chemicals that shield the skin from urushiol. "We think people would appreciate something like a suntan cream that could be applied before going into the woods," says team member Susan Orchard. "Already we have found a preparation of organic salts that protects all test subjects from dermatitis for eight to 12 hours when droplets of urushiol were taped onto their skin with a patch. It also protects about one-half of the volunteers for 48 hours."

With all this progress in research, some hoary myths are being debunked or confirmed. For example, scientific evidence now indicates that it is impossible to contract dermatitis just by standing near the plants. Urushiol is a heavy oil that does not vaporize. Moreover, it is in canals inside leaves, stems and roots; an undamaged plant has no urushiol on its surface.

The leaves are easily bruised, however, and insects chewing on them can produce spots of urushiol on the surface. Moreover, direct contact with the plant is not a prerequisite for getting the dermatitis. Shoes, clothing, tools, pets or golf balls that have been through the rough can all transmit the sap to people. And they may cause rashes days, months or possibly years after they touched the plants.

Today, the myriad of preventives and cures that have been proposed in the past can be better assessed. Home remedies, patent medicines and "guaranteed" cures of the past have included bathing in horse urine or bleach; cleaning the skin with gasoline, morphine, gunpowder, buttermilk, marshmallows or strychnine; drinking photographer's hypo; or rubbing on ammonia, mustard, Lysol, hair spray, clear nail polish, meat tenderizer or toothpaste. All are probably useless, some even dangerous.

Drinking milk from goats that have grazed poison ivy or poison oak has long been claimed to give immunity. (Goats have such an appetite for all parts of the plants that, given time, they can eliminate them from a pasture.) "This is one folk remedy that probably works although it never has been tested," says Vera Byers. "There's something magic about oral doses of urushiol oil, and goat's milk probably has traces of it. If you drink goat's milk you're probably doing about the same thing we are in our vaccine work."

Although we are now getting such practical insights into this affliction, Harold Baer of the Food and Drug Administration—himself a longtime poison ivy researcher—cautions against too much optimism. "There have been innumerable remedies proposed in the past, and few have withstood the test of time." What is different today, however, is that researchers have designed experiments that provide fundamental and reproducible information under controlled conditions. With that, more reliable weapons are being forged.

"The poison oak story is beginning to make more and more sense," says Jerry Oltman, who now looks back on the Marble Cone Fire with a different perspective. "Very little of it is science fiction anymore."

Botanical illustration shows characteristic shape of leaves, berries and detail of flowers (to the right) of poison ivy, Pacific poison oak, and poison sumac. Berry stalks of poison sumac arc upward at first, droop over distinctively in the late summer, autumn.

poison ivy
poison oak
poison sumac

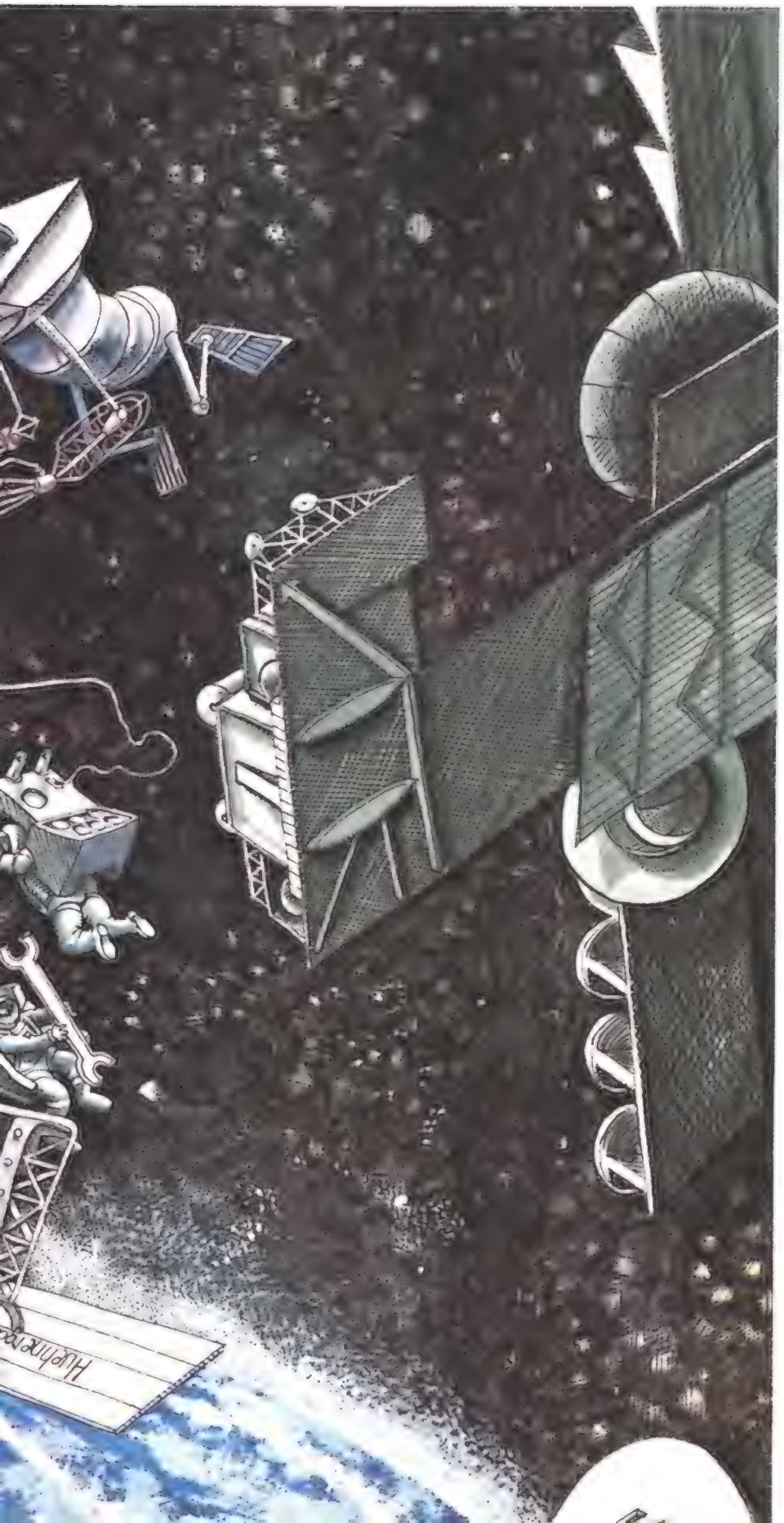
By Stephen P. Maran

Roadside service: the right stuff for space clunkers

As more satellites get into orbit—and trouble—new technologies are being developed for on-the-spot maintenance

Traffic is on the increase and insurance premiums are skyrocketing. Prices are way up, so owners expect longer operational lifetimes, despite serious wear and tear. Things are falling from overhead, it takes forever to get a tow and lately Japan has complained about U.S. workmanship. The subject at hand is not automobiles but satellites that cost tens to hundreds of millions of dollars.

Fortunately, help is on the way. Last year, three malfunctioning unmanned spacecraft—the Solar Maximum sun-watching observatory and two communications satellites—were snagged in space by NASA astronauts. Solar Max was fixed on board the space shuttle Challenger in April 1984 and dropped back into space. The others, Palapa B2 and Westar 6, were retrieved by Discovery in November for repair on the ground. In addition to these successful servicing missions, a Challenger crew last October demonstrated the practicality of refueling satellites to extend their orbital life. The Orbital Refueling System flight demonstration used real fuel, and connection of the necessary hoses was carried out in the shuttle's payload bay. Such missions are inspiring spacecraft designers to equip satellites with key systems that can be repaired, retrieved or refueled in space, and to design the craft for ease in docking with the robot arm of the space shuttle, with attachment devices carried by free-flying astronauts wearing rocket-powered backpacks, or with a future servicing "space tug" called the Orbital Maneuvering Vehicle (OMV).



Now on the drawing boards, the unmanned, remotely piloted OMV will hitch a ride into space aboard a shuttle, then fly off to dock with satellites beyond the shuttle's range. It will tow them in for repairs at the space shuttle or the future U.S. space station or for return to Earth in the cargo bay of the shuttle. When possible, however, it will service the satellites itself, so that a satellite that has run out of control gas or that suffers from a malfunctioning power unit or other vital system can be refueled or restored to near-new condition. Of special importance, the OMV will boost a satellite to a higher orbit, preventing or postponing an impending fall to Earth.

In a major departure from previous space practice, the OMV will be remote-controlled by *teleoperation*, a technology in which a person is provided with TV screens that display what would be seen if he or she were actually on board the OMV, docking with or servicing a free-flying satellite. The person will be at a distance, perhaps safely ensconced at a console in a ground control center, manipulating hand-grip controllers much like someone playing Pac-Man. Or the operator might be aboard the space station, supervising OMV servicing of space platforms near the station or on the exterior of the station itself. Instead of the thousands of daily preplanned, computer-generated commands beamed up from the ground to operate a typical unmanned satellite, the instantaneous reactions of the person in the control loop will govern the repair ship.

Psychologist Nicholas Shields jr. at the Essex Corporation in Huntsville, Alabama, has been studying

With assistance from astronauts in rocket-powered backpacks or at remote-control panels, "space tugs" could retrieve, refuel and repair satellites.

Illustrations by John Huehnergarth

After three satellite launches failed in 1984, insurers grew wary of underwriting commercial craft.

how human controllers can best work with the video monitors of teleoperator systems. He is testing everything: brightness, size, colors, patterns, even the designs of letters and numbers. He is measuring the controllers' ability to estimate distances to targets and how the targets deviate from the horizontal or vertical in relation to the repair craft. Shape discrimination is critical. Highly angular shapes are easier to recognize on the screen. Thus spacecraft designers might consider using bolts with triangular heads, say, in spots where they may have to be removed in space. Lighting is also important: Shields found that robot craft should carry lights so that human operators can see what is in the absolute shadows in the harsh solar illumination of outer space.

Real-time human control of the OMV (as opposed to the exact, preplanned schedule of a mission) is needed because, in servicing a broken satellite, it is impossible to anticipate exactly how things will go. Despite more than three years of planning and simulation tests for the Solar Max repair mission, astronaut George (Pinky) Nelson found that an attachment device would not lock onto the errant craft. The Challenger crew tried another way, bringing Solar Max on board with the shuttle's manipulator arm. A comparable problem was encountered by the Discovery astronauts. When Palapa and Westar wouldn't fit on the shuttle, they had to depart from plans made on the ground, resorting to human ingenuity and a little brute strength. But even these human qualities failed last April when Discovery astronauts unsuccessfully attempted to revive a Navy Syncom satellite after it was successfully deployed but didn't turn itself on. The crew tried to flick the satellite's stuck timing trigger with a flyswatter device made out of parts cannibalized from their ship. Ultimately, some satellites may be designed to be autonomous, meaning that on-board computer programs supposedly will help them fix themselves. In the meantime, servicing by astronauts and by teleoperated OMVs is the name of the game.

Frustrated with the high cost of auto transmission repairs, I once gave an old Buick to a tow-truck driver on the New Jersey Turnpike. The car was worth less than the next repair would cost and there was a certain satisfaction in foisting that lemon on someone I'd never see again. In contrast, the technology of retrieving satellites in space has advanced to the point where many are worth fixing and need no longer be abandoned as they wear out or go on the fritz. By one estimate, NOAA's ailing Landsat 4 satellite could be repaired in space for one-fourth or less its replacement cost. (Whether it's repaired or not may depend on who owns it, however: the Commerce Department is negotiating with potential buyers for a commercial Landsat program.)

Defective satellite parts can be rebuilt like many automotive components and reused or resold. After the malfunctioning attitude-control unit, a system that keeps a satellite from wobbling or tumbling, was replaced in the Solar Max satellite, the old unit was brought to the ground for repair. Refurbished and with its three blown fuses replaced with larger ones,

The author, an astronomer working on the Hubble Space Telescope, often writes about celestial topics.

it will be installed in an Upper Atmosphere Research Satellite to be launched late in the decade.

The cost of insurance sometimes determines whether you stay in business. When insurance premiums on commercial satellites soared last year after the failed launches of Palapa B2, Westar 6 and a third spacecraft, Intelsat VF9, sponsors of future space ventures, including those planned to serve communications in Brazil and in the Arab world, became alarmed. The insurers paid millions to the owners of the three satellites (reportedly $105 million for Westar 6 alone). But, as my State Farm agent would say, they were not a total loss. Although Palapa and Westar were stranded in the wrong orbits, as useless as cars stuck in muddy ditches, they were rescued after nine months of planning and simulation tests. Shuttle astronauts Joe Allen and Dale Gardner, wearing space suits and self-propelled Buck Rogers backpacks, captured Palapa and Westar and stowed them safely on board Discovery. After refitting at a Hughes Aircraft plant, the satellites will be available for reflight. The insurers should recoup some of their losses on the original launches through sale of the slightly-used spacecraft, even though they've each gone around the world more than once. It's not the mileage, it's the condition, as any used-satellite salesman will tell you.

The demonstrated ability to rescue expensive stray satellites should help keep insurance premiums under control. It also means that as scientists plan expensive future observatory spacecraft, NASA or other sponsors need some assurance that a simple component failure need not result in the loss of a bird. With development costs exceeding one billion dollars for large, complex satellites like NASA's Hubble Space Telescope, this is a major consideration. The HST, planned for launch aboard the space shuttle in the summer of 1986, is intended to work properly in space for 15 years. To help it live that long, about two-dozen on-board systems, including the 40-foot-long solar power arrays, are designed for replacement in space. To simplify the replacement tasks, handholds and footholds for astronaut servicemen have been designed into the telescope.

Satellites and space junk are filling the spaceways. In the first two months of this year, the USSR alone reportedly launched 20 unmanned satellites. That's in addition to well over 5,000 orbiting objects larger than a baseball, launched by the United States, the Soviets and other nations, already under surveillance by the North American Air Defense Command. Thus far, no significant collision has been reported. The burned-out, orbiting upper stage of an older Soviet rocket, traveling at almost 7,000 miles per hour, did pass within eight miles of the space shuttle Columbia on one occasion, close enough to encourage continued study of the hazard of space collisions.

Just as more cars on the road mean more business

Mechanics on the ground could use remote-control teleoperation technology to replace satellite parts.

In the future, Orbital Maneuvering Vehicles (OMV) could boost satellites out of decaying orbits.

for the AAA and Mr. Goodwrench, more satellites in space mean that there will be more spacecraft in need of repair. It also means that the collision hazard, still slight, will increase inexorably. In 1981, the American Institute of Aeronautics and Astronautics called the chances of a space collision "not severe" but capable of reaching "unacceptable levels, perhaps within a decade." The odds on a collision are going up not just because more spacecraft are being launched but also because they are getting larger. Some of the first space satellites were no bigger than a bread box, but the U.S. space station, to be assembled in orbit in the early- to mid-1990s, and various planned or proposed large space platforms and huge radio reflectors and solar power generators in space, will be bigger than the side of a barn, and thus are more likely to be struck by debris floating in space or by abandoned, out-of-control satellites.

Body-shop prices being what they are, especially if the shop has to come to the body rather than vice versa, engineers are proposing defensive maintenance for large space structures. One possible task for the OMV, says Bill Huber, OMV Project Manager at Marshall Space Flight Center in Huntsville, Alabama, is to capture dead or tumbling satellites or other space junk before they can hit the space station. Thus the robot craft would be a wrecker as well as a servicing vehicle. This application is still in the brainstorming stage, but Huber reports that the OMV's "Tumbling Satellite Kit" might be "like a net or a catcher's mitt" so that it can snare an approaching junker as deftly as Yogi Berra used to stop a low-and-outside fast ball. Martin Marietta Aerospace near Denver is studying this as well as another approach: instead of deploying a mitt or net, the OMV might latch onto a tumbling satellite with a grapple fixture bearing an adhesive pad of some kind. Whether the adhesive would work is still a sticky subject.

Reentry in 38 centuries—a SNAP

If the danger of collisions between satellites is still a bit remote, there may be a more immediate need to deal with satellites liable to collide with the Earth. The Russians may be working on this one, since nuclear reactor parts falling from two of their satellites (Cosmos 954 in 1978 and Cosmos 1402 in 1983) caused considerable concern. The only American orbiting nuclear reactor, SNAP-10A, operated for 43 days in 1965 until a component failure shut it down. It remains in a high orbit, safe against reentry for about the next 38 centuries. Many U.S. spacecraft, however, have got power from the heat generated by the spontaneous decay of radioactive isotopes (a different process from that which occurs in fissioning nuclear reactors). Some of these craft have fallen to Earth, but with no apparent long-term effects.

Although nuclear reactors are not incorporated in present and currently-planned U.S. satellites, stopping some of our satellites from falling may prompt urgent service calls. Friction with the thin upper atmosphere gradually brings satellites down. Most break up and fall harmlessly upon reentry to the dense lower atmosphere. Satellites in high orbits are apt to stay up for millennia or longer, but in the low orbits characteristic of many present and future satellites, friction and gravity take their toll relatively rapidly. The space shuttle, now used to launch most NASA satellites, is the United States' only existing means of reboosting falling satellites. The French and the Russians are

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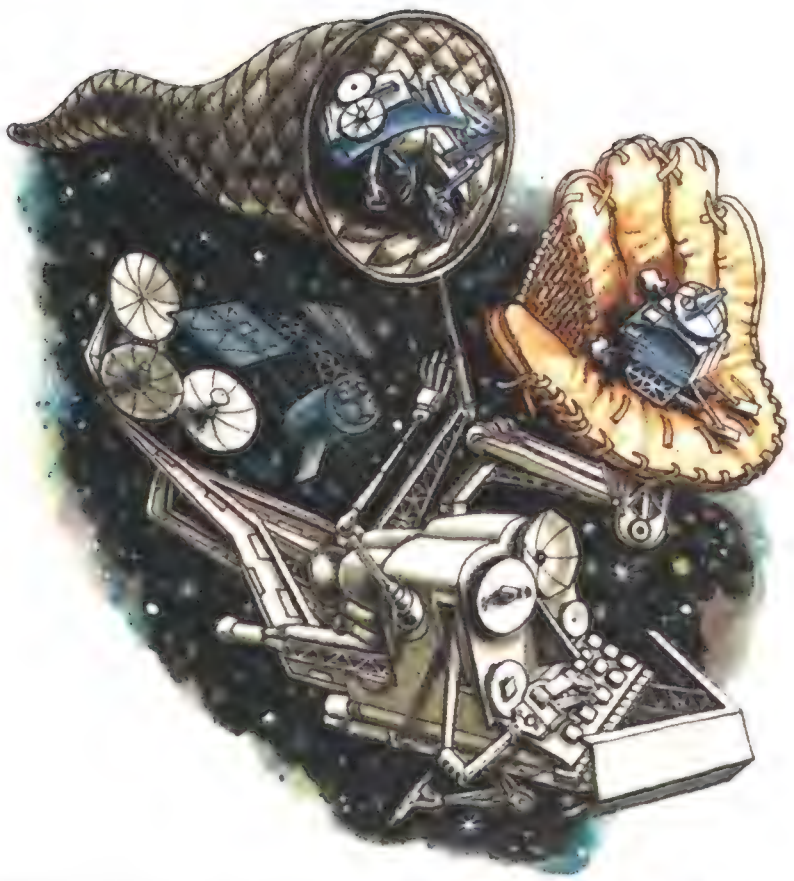

OMV may also snare tumbling satellites on the fly, possibly with catcher's-mitt or netlike devices, and . . .

working on space shuttles of their own, no doubt for this among other purposes. But the shuttle can only go so high, the altitude gained depending on the weight of the payload, the thrust of its engines and whether the desired orbit lies in the plane of the Earth's Equator, is tilted at a wide angle to the Equator so as to take the craft over polar regions, or is tilted at some lesser angle.

When loaded down with a large, heavy satellite, such as the 11-ton Hubble Space Telescope, the shuttle will reach an altitude of only about 320 miles. At that height, the telescope will be sensitive to increased atmospheric friction, which occurs at times of peak solar activity. On such occasions, ultraviolet rays from disturbed regions on the sun will heat the Earth's atmosphere at levels below the telescope's orbit. The denser gases will rise and the telescope will encounter more friction. According to a worst-case scenario, it would be necessary to reboost the telescope with the space shuttle as frequently as once every nine months near the time of peak solar activity (which occurs once every 11 years), an expensive proposition. Using the OMV as the tow truck, however, the telescope can be brought to greater heights than the shuttle can reach, so that its frictional descent would be minimized. Albert Boggess, a principal scientist working on HST at Goddard Space Flight Center in Greenbelt, Maryland, considers that "reboosting the space telescope is the most important justification for building the OMV."

Satellites fail and need repair because of faulty components as well as the hazards of space. When a satellite fails and cannot be repaired, there may be immediate consequences for government, industry or consumers. After Japan's new television broadcasting satellite BS-2A failed in May 1984, the Japanese TV agency NHK had to drop plans to impose service fees on thousands of prospective viewers on outlying islands. Entrepreneurs who planned to manufacture and sell 17,000 satellite reception antennas were equally disappointed. The costly failure led a Japanese cabinet minister to complain to Vice President George Bush because the satellite was designed in Pennsylvania by General Electric. Actually, the tubes that failed were made in France. Sobered by the BS-2A failure and other recent satellite problems, the Japanese are thinking about preparing to fix future satellites themselves.

Even when everything works fine, a satellite may fail eventually as stored consumables, such as propellant gas for thrusters or coolants for sensitive radiation detectors, are exhausted. Thus IRAS, the Infrared Astronomical Satellite that discovered the first evidence for what may be planetary systems around nearby stars, had just under a year of useful life, terminating its observations when liquid helium used to cool sensitive infrared detectors ran out in November 1983. "Einstein," a spacecraft which focused x-ray telescopes on

. . . perform "doctoring" missions to distant satellites, using the space station or shuttle as a home base.

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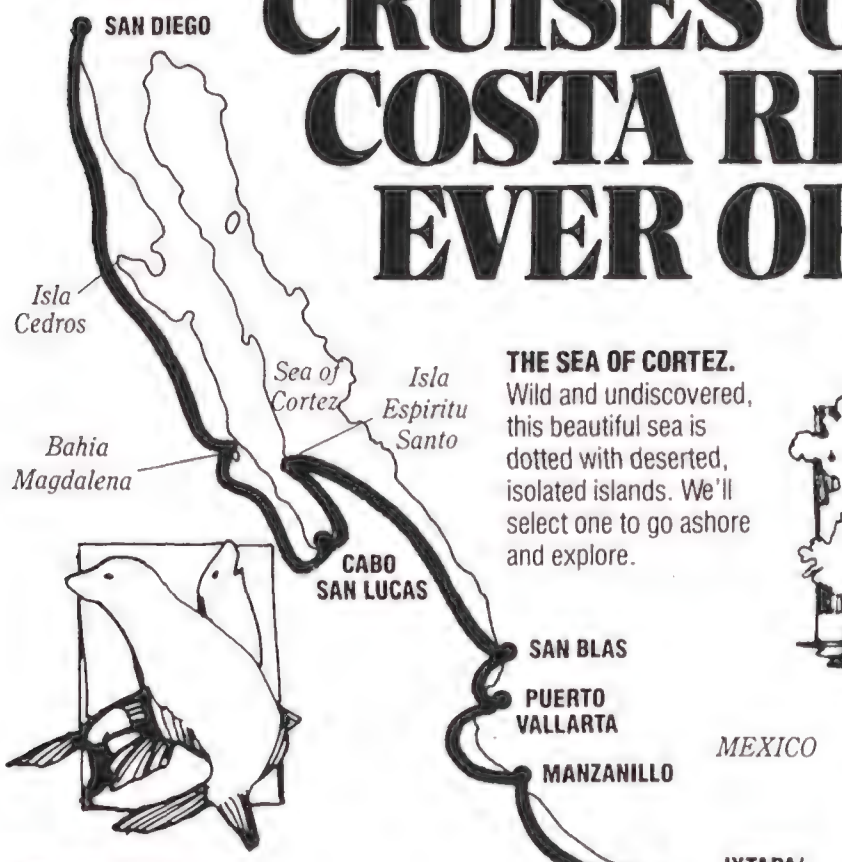

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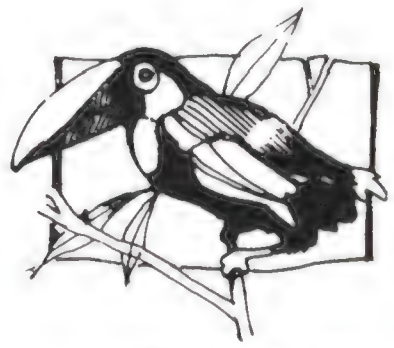

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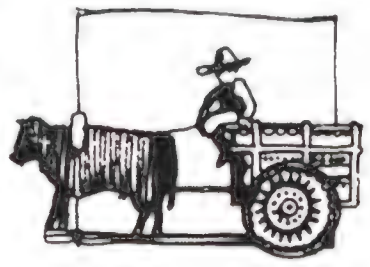

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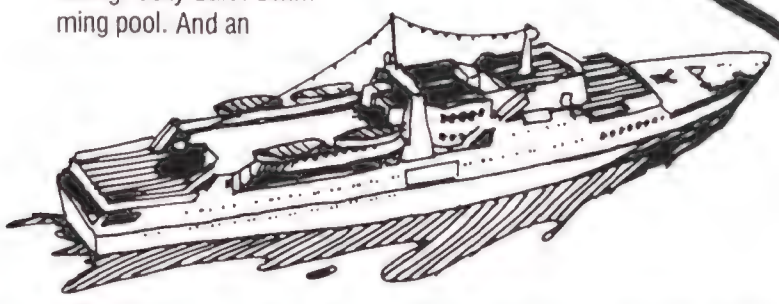

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suspected black holes and other exotic celestial phenomena after it was launched in 1978, had a lifetime of about two and a half years because of its limited supply of control gas. Guenter Riegler at the Jet Propulsion Laboratory says Einstein's controllers had to carefully apportion the gas over the last half-year in orbit. Later, the satellite reentered the atmosphere and was destroyed. The exhaustion of consumables on IRAS and Einstein was anticipated; nevertheless, scientists would have preferred to operate the craft much longer.

NASA plans to refuel satellites with control gas and to reload them with coolants in the future, so that scientific measurements can extend over longer periods in space. The more dollars that are invested in a satellite, the more it makes sense to keep it going so long as the information gathered is still of major importance. Frank Cepollina, manager of the Satellite Servicing Project at the Goddard Center, refers to broken satellites as "assets" in orbit, waiting to be reclaimed. The Gamma Ray Observatory, a satellite now slated for launch in 1988, will carry about 5,000 pounds of hydrazine fuel, which can be reloaded in space, according to Cepollina. And if GRO's solar panels or antennas do not extend upon command, astronauts can rendezvous with the satellite and crank them out by hand, like shopkeepers unfurling their awnings.

Besides refueling satellites, repair missions of the future will replace spacecraft systems that deteriorate from extended use or exposure to space. They will interchange scientific instruments with newer ones as the original equipment becomes obsolete. Batteries wear out in space just as they do under the hood of your car, and solar power cells, struck by charged particles such as cosmic rays, gradually lose their ability to generate electricity efficiently. Cosmic rays can also damage delicate electronic microchips used in satellites.

Cepollina and other space engineers are urging their colleagues to construct satellites from similar, interchangeable modules to the maximum extent feasible. Sherman Schrock, a program manager at Martin Marietta Aerospace, explained: "There is no way we can deal with six different propulsion modules" in servicing six different satellites at the space station. "Each one would need different servicing and refueling fittings." If identical interchangeable modules are used on satellites, a trend which seems to have arrived, it will be practical to stock spare units on the space station. The use of similar modules will also allow for the standardization of repair techniques used by astronauts or teleoperator controllers.

Sometimes waiting for the tow truck is more frustrating than trying to get your car fixed. The waits, right now, are even longer in space. Astronauts and cosmonauts have been repairing their own manned craft for years, but Solar Max was the first unmanned satellite to be repaired in space. Despite this milestone, it took over three years from the failure of Solar Max's fuses in November 1980 to the successful repair mission in April last year. The time was spent in planning and simulating the mission, building the necessary equipment and testing the Manned Maneuvering Unit, as the Buck Rogers-type rocket-powered backpack is officially known. Along the way, NASA also completed and test-flew the space shuttle (its first flight came in 1981). The shuttle brought the astronauts to within easy backpack distance of Solar Max; without its ability to rendezvous with other orbiting spacecraft and to return to the ground, the repair mission could not have been undertaken. Lead time was shortened to just nine months for the Palapa and Westar retrieval mission, and could be much shorter for many service calls once the OMV is operating early in the 1990s.

For instantaneous reaction, as needed if a manned craft were in danger or, say, a critical defense satellite were disabled, we must look to the more distant future. At Langley Research Center in Hampton, Virginia, analysts are studying the feasibility of so-called "Orbit on Demand" vehicles. The manned OODs would be ready to take off in minutes—even in bad weather—once they were placed on alert status, and could reach distressed satellites in a variety of orbits. Contrast this with the ponderous rollout and elaborate prelaunch countdown of the space shuttle, currently the world's best booster. With Imperial Storm Troopers hot on their heels, Han Solo and Chewbacca were able to leap aboard the *Millennium Falcon* and take off in a flash. That's easy in the movies, but our day may come.

As any used-satellite salesman can tell you, "Mileage doesn't matter, it's the condition of the craft."

USED
SATELLITES
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By Richard Wolkomir

A playful designer who believes that the kids know best

Bob Leathers' playgrounds are planned with children's help; then the community raises money, begs, borrows—and builds

Design Day, Jack Elementary in Maine: kids clamor for Bob's attention as he ponders their latest ideas.

A swarm of kids and 350 beaming adults stood on the lawn of the Mount Vernon, Iowa, elementary school one bright Sunday evening last April. In unison, they counted down: ". . . ten—nine—eight—seven. . . ."

At "zero," the kids whooped. And then, like Crusaders storming the walls of Jerusalem, they ran full tilt onto their new playground, finished just ten minutes before, a crenellated, turreted, ramped, bridged, cubbyholed and passagewayed complex of transmogrified tires, salvaged telephone poles and lovingly sanded pine boards.

The children clambered up the playground's castle turrets and they slid down and around a corkscrewing slide. They spelunked in tractor-tire caves, bounced across a rubber bridge, manned the steering wheels (detached from junked cars) of the spaceship-clipper-racer-whatever-you-want creation at the playground's center, and slid yelling down the fire poles, while the Mount Vernon High School "Wonder Band" oompah-pahed. Mothers, fathers, teachers and neighbors, who had just finished sawing and nailing the playground together, watched with extremely broad smiles.

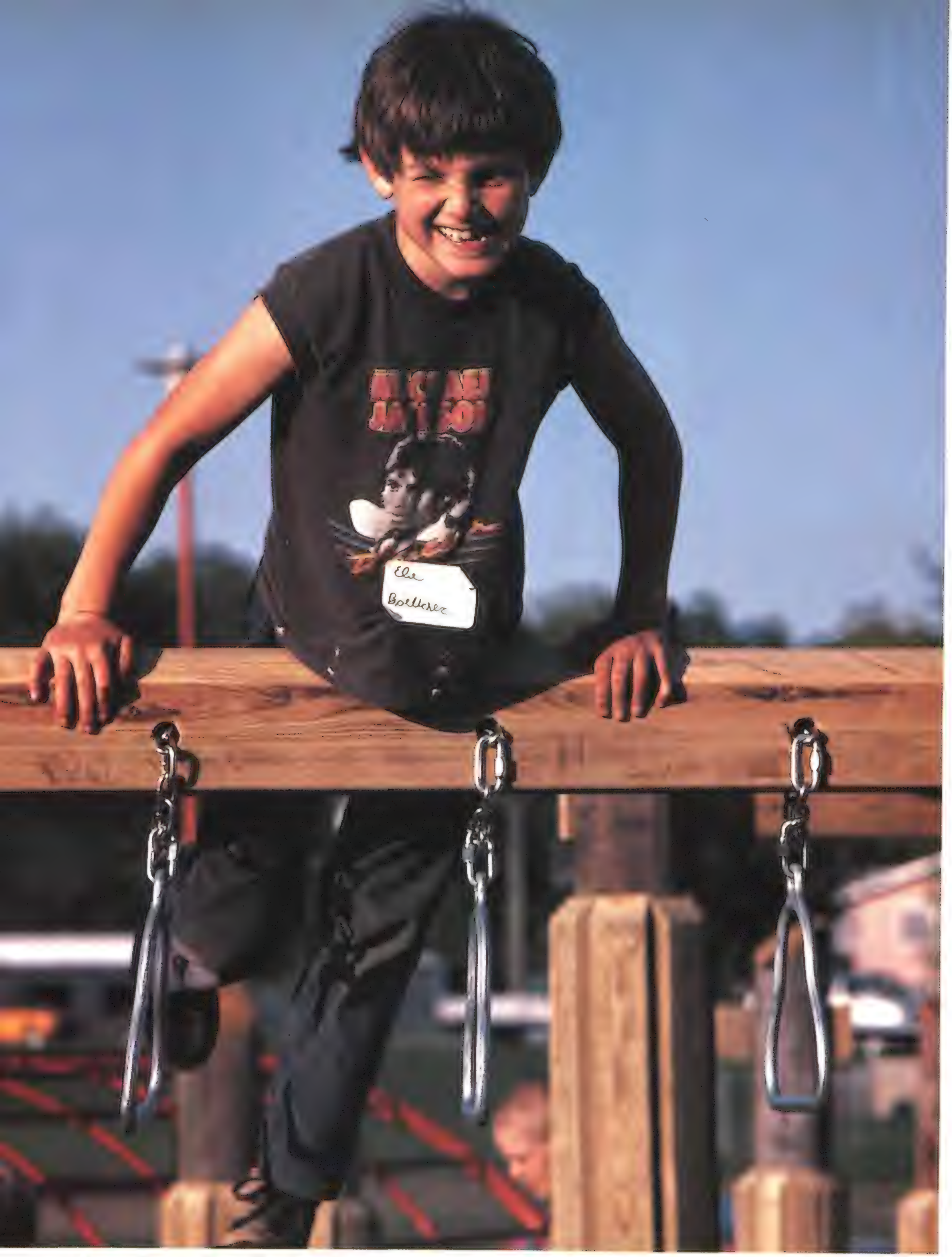
In the middle of the uproar, powdered with sawdust, ebullient as a new daddy about to pass out cigars, was Bob Leathers, a gray-mustachioed architect with a fringe of shoulder-length graying hair, who wore battered Nike running shoes, jeans, a denim jacket, a frayed Israeli Army work hat, and a big, boyish grin. Leathers—Central Casting's ideal raffish gunslinger with a golden heart—is the godfather of Mount Vernon's two new playgrounds, and of approximately 250 others across the country, each the product of a 1980s variation on an American tradition: the community barn raising.

From his offices in Ithaca, New York, Leathers goes Johnny Appleseeding across the country, planting vacant lots and school yards, not with McIntoshes and Baldwins but with playgrounds concocted from piles of donated lumber, nails and general flotsam, built by brigades of volunteers. Visually, the playgrounds are stunning, perhaps because they are constructed, chiefly, of a rare intangible—community spirit.

Leathers' playgrounds are designed, to a surprising extent, by the children who will use them. They are funded, largely, by donations of money and materials from local citizens and businesses. And they are constructed by hundreds of turned-on kids, moms, dads, teachers and neighbors, many of whom have never before wielded a hacksaw or even heard of a boom auger, which drills holes for telephone poles.

"Kids are great, but what really gets me is the community thing, maybe because I grew up as an only child in Bangor, Maine, maybe because I spent seventh grade alone at home paralyzed—only temporarily, thank God—with polio, and certainly because I'm a product of '60s communalism," says Leathers.

As a child, when he wasn't helping at his father's Bangor gas station, he was building tree house after tree house, some two or three stories high, with a troop of friends. "The woods are still the best playground



In Mount Vernon, Iowa, Ebe Boettcher, nine, tries six-foot-high ring bridge; the top is sloped so children won't use it as a balance beam. Then he pronounces the finished playground "not easy to get bored in."

Photographs by Richard Howard

Chosen as emissary from her class at Jack, Jaimie Hannaford, eight, takes her responsibilities seriously.

Brainstorming in cafeteria, children consult with their architect: A platform for break dancing?

All agog, preschool tots at Adams vie in presenting desires: "Spider web!" "Haunted house!" "Mermaid!"

there is," he says. And his mother remembers him at the beach, constructing intricate sand villages, from which other children were banned. "They had no respect," Leathers grumbles. After graduating from the Rhode Island School of Design in 1965, he joined a large Oregon architectural firm, designing office buildings. He and his family lived in one of that era's flourishing communes, and he spent his spare time designing light-and-sound "happenings" for rock groups.

"I worked at a community theater, which I continued when my family and I moved to Ithaca, but then I discovered that, for bringing a community together, even better than theater is a real happening—a playground," he says.

The discovery was serendipitous. In 1970, when his three older children were still tykes, he volunteered to design an Ithaca school playground. Then other nearby schools persuaded him to do the same for them. An admiring visitor wanted a playground for his Long Island community and that led to more requests even farther afield.

Until 1981 the playgrounds were a nonprofit hobby for Leathers, who has all the energy of a hyperactive 11-year-old. His wife says "he even sleeps at 100 miles per hour." Even so, at approximately 40 playgrounds a year, he has had to incorporate the projects into his regular architectural practice. Playgrounds now make up 40 percent of his firm's output. He charges less for them, however—his fees for designing, organizing and supervising the construction of a playground range from $1,500 to $6,500.

He still insists on community effort, even for such unlikely clients as Ling-Ling and Hsing-Hsing, the pandas in Washington's National Zoo, for whom he recently designed an outdoor play and exercise structure. "In this case," he says, "hundreds of volunteers turned out to build something for these national treasures."

Leathers "met" with his "clients," observed their antics, talked with their keepers, studied their natural environment and consulted with zoo experts. Then, in wood, he created a structure inspired by the ridges and ledges of the Chinese mountains where wild pandas climb.

A more typical playground project got under way at Jack Elementary School, in the Munjoy Hill area of Portland, Maine, one sunny Thursday morning last April. On this "Design Day," Leathers—wearing his customary denims and a red T-shirt with a sketched playground captioned "We Built It Together"—sat at a cafeteria table, his pencil poised over the half-drawn plan for a playground. Sixteen wide-eyed kindergart-

The author tried out, and survived, everything on playgrounds but tunnels ("undignified") and slides ("a big regret—couldn't get near them for the kids").

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Thursday 7 A.M., Mount Vernon: construction time, elementary school; some phone poles are in place.

Thursday, 6 P.M.: poles and posts all set, maze floor (center) is begun; at the right is a pyramid frame.

Saturday, 8 A.M.: three-quarters of the platforms are finished, as are castle towers, made in prefab area.

ners crowded around him, hands raised and vibrating.

"OK, now this playground is going to have a lot of bouncy bridges, and a big tower, and over here's a tunnel, and there are rings for you to swing on, and a big dinosaur you can climb—anyone want anything else?" Leathers asked.

"A slide?" suggested a towhead, wearing a Celtics sweat shirt.

"OK, see this dinosaur's tail?" said Leathers, pencil darting at the plan. "That's going to be a bumpy slide that goes right into this cave full of . . . MONSTERS!"

"A curvy slide?" asked a freckled redhead in green.

"That's a good idea," said Leathers. "Let's see if we can make this bumpy dinosaur-tail slide a curving slide, too." His pencil darted and the dinosaur's tail acquired a dramatic curve.

After the kindergartners' teacher led them away, a class of first-graders crowded around the architect. "You know what's under this bridge?" he asked. "You know the three Billy Goats Gruff?" "A TROLL!" clamored the children. "We're going to build this in four days," said Leathers, "and do you know who's going to build it?" "WE ARE!" the children cried.

Meanwhile, school principal Cheryl Jensen showed a visitor the school's corridors, plastered with playground artifacts, from a drawing of smiling stick figures swinging hammers to playgrounds modeled in clay and sheets of paper listing "our ideas."

"This is Portland's inner city, and 91 percent of our pupils come from low-income families," Jensen said. "For many of them, the school is the most stable thing in their lives. Many have never been on a bus, to the beach, or even out of the neighborhood—for them, this playground could be a real enrichment."

That evening, 150 dubious parents filtered into Jack Elementary's gymnasium for the kickoff meeting. Attorney Ned Chester, the chief organizer, told a visitor that the area, in the late 1800s an Irish-Italian immigrant neighborhood, was now ethnically mixed, the latest influx, young professionals and skilled workers attracted by the cheap houses and vistas of Casco Bay.

Bob Leathers took the microphone and showed slides of some of his completed playgrounds. One man worried that the playground soon would be vandalized into rubble. "When the kids and the community build these projects themselves, the good feeling lasts," Leathers said, with a preacher's fervor. "We've put up these playgrounds in tough sections of New York City, and they're still doing fine."

By meeting's end, the audience had learned that two playgrounds—one at Jack and one at nearby

Friday, 8 A.M.: decking for the castle is at left rear; railroad-tie edging, held fast by steel rods, is being laid.

Sunday, 8 A.M.: tire "cubes" (right of maze) and bridge to castle are in; river gravel is being spread.

Adams School—would cost more than $200,000 built commercially. However, with volunteer labor, loaned tools and donated supplies, it would be about $35,000. They would be able to raise the money, Leathers assured them. "I wanted to keep costs down for a playground in Sodus, New York, where a lot of the people are very poor—migratory apple pickers—but they said, 'We don't want a second-rate playground.' I told them that if they could raise $5,000 it would be a lot. They raised more than $30,000!" Applause broke out and people began signing up for volunteer committees.

Meanwhile, a thousand miles to the west, Mount Vernon, Iowa—atop a hill, with a population of 3,500, including 1,100 students at Cornell College—was out to prove that a community really could build its own superplayground. Leathers had blown in the previous September, staying with a local family to cut the community's costs. He had met with students, designed playgrounds for Washington Elementary School and Mount Vernon Middle School, whipped up enthusiasm and buzzed out of the nearby Cedar Rapids airport, leaving precise guidelines for committees to be formed, money to be raised, and materials and tools to be begged, borrowed or, only as a last resort, bought. Project coordinator Jackie Martin, a preschool teacher and author of children's books, and fellow volunteers found themselves responsible for making two community playgrounds happen.

"I'm from Meredith Willson's hometown, Mason City, Iowa, which he called River City in *The Music Man,* and I couldn't help thinking that Bob Leathers is a lot like Professor Harold Hill in the musical, stirring up everyone in town," Superintendent of Schools Adrian Ringold pointed out. "Bob Leathers was such a dynamo," Carol Dillard added, "you could almost hear those 76 trombones!"

Over the winter, Mount Vernon's playground enthusiasts dug in. "First we did 'Buy-a-Board,' with kids collecting donations for the playgrounds' wood, three dollars for each board—they raised more than $7,000," says Mrs. Dillard, a homemaker who cochaired the all-

Monday, 6 A.M.: *Voilà!* The finished playground has withstood Sunday evening onslaught by kids of all ages.

Does double slide really work? Gleeful Don Swenson, 48, high school guidance counselor, tests to be sure.

important fund-raising committee. ("I went to the initial meeting just to see what was going on and walked out the treasurer.") Her daughter Sarah, in grade three, alone sold 40 boards. One sunny October day, 35 kids gleaned a farmer's fields for unharvested corn, tossing two tons of ears into a pickup truck for sale to a grain elevator. Then there was the monster "garage sale" in a big auction hall, when Mount Vernon's citizens gathered to buy back the various castoffs they had previously donated, everything from water heaters to a pedigreed black-and-white rabbit, which went for nine dollars. The sale netted another $5,500. A Cornell social group raised about $300 collecting deposit cans and bottles. And there was a chicken dinner, raffles and a Rotary versus Lions basketball game, plus individual and business donations. Suddenly it was spring and the playground committee found, to its astonishment, that it had raised $40,000.

A few months earlier, Mount Vernon's citizens had had a veritable civil war over the esthetics of a new spaceship-style water tower that now dominates the skyline. "We needed something healing, and this playground project was it," Carol Dillard explained.

Wizards with money and equipment

By April 23, when Leathers flew back with two assistants—Ernie Bayles and Barry Segal—Mount Vernon's playground activists, besides raising large sums, had, wizardlike, caused donated equipment to accumulate in magnificent heaps. Materials chairwoman Connie Boettcher ("This Is No Ordinary Housewife You're Dealing With," said the legend on her football jersey) stood on the Cedar Rapids wrecking company's trailer that served as her on-site headquarters, presiding over her hoard of carriage bolts, eyebolts, machine bolts, drill bits, sandpaper, duct tape, nuts, nails, washers and caulk donated by Beranek's True Value and the Mt. Vernon Farm & Home store.

She also commanded tubs of custom-cut washers supplied by the Mt. Vernon Steel & Wire Co. for bolting together the 40 tractor tires, 100 semi tires, and 300 car tires that Connie, six other adult volunteers and ten kids had collected in Cedar Rapids in an all-day downpour, hauling them home on a truck furnished by Wilkin Elevator of nearby Lisbon. Now a tractor donated by a carpenter was scooping up sod from the playground site. Cedar Rapids' Plaza Paint had contributed gallons of paint, sealer, thinner and six cans of spray paint, which Barry Segal was using to color code scores of embedded stakes indicating spots where the boom auger, on loan from Linn County Rural Electric, should drill holes for the telephone poles, from Northwestern Bell, that would hold up the playground.

On Thursday—cloudy, windy and cold—a steady

Volunteers scramble to put finishing touches on the playground at Washington Elementary. Steering wheels from junked cars, placed in "V's" of central structure, will turn it into racer, rocket ship or clipper.

Boards are drilled in prefab area before being installed.

Third-grader Patrick Elliott scrubs semi tire. Later, it will be sealed for protection.

Pyramid side is notched to recess chain for swing.

stream of volunteers was signing in at the registration tent. By now a forest of poles stuck up starkly from the ground, evoking the aftermath of a forest fire. Stoically surveying this unpromising scene, a freckle-faced third-grader named Tim Jones said hopefully: "Well, it looks like a pretty good playground so far."

Work started in the mornings at 7 and usually continued until about 10 at night, under lights. A carnival atmosphere set in to the music of construction, with several hundred hammers providing the percussion and circular saws screeching the tune. Connie Boettcher mashed her thumb and the doctor thought it was broken, but she was back quickly, handing out tools with one hand in a cast. Dorsey Chambers, a Cornell College sophomore from Chicago, had two blood blisters, a big sliver in one finger, and a sore back from leaning over a sawhorse all day sanding, but she was having a good time. "In Chicago I don't even know any of my neighbors," she said, bolting together tires with Tom Madson, the high school principal. Nobody knew exactly what the tires were for. Nobody knew why they were nailing what they were nailing, or digging where they were digging. Only Barry Segal and Ernie Bayles knew, but they were too busy to explain. And so was Bob Leathers, racing between the elementary school and middle school sites in a borrowed jalopy with no muffler. But by Friday morning, Leathers careened onto the site in a shiny new Ford,

Anne Halsey, 11, intently practices for a contest to see who can stay the longest on platform swing.

which had been lent him by the local dealership.

In fact, the jumble of posts and boards was taking shape. At one end, to the astonishment of those who had been working on it, a castle was rising. Bolted-together tires, now topped with wooden platforms, had become tipsy seats to ride. A corkscrew slide was half-assembled. And that conveyor belt was becoming a bouncy bridge between two platforms.

Hundreds of volunteers swarmed over the site, wielding loaned tools. There were 100 extension cords, 300 hammers, six chain saws, two backhoes, a front-end loader, 40 levels, 50 scrub brushes, 25 electric drills, 30 rakes, 20 wood rasps, 12 belt sanders, four disk sanders, 45 circular saws, 60 sawhorses, 20 screwdrivers, 40 shovels, 35 framing squares, 15 combination squares and eight wheelbarrows, not to mention socket wrenches, open end wrenches, electric impact wrenches, crescent wrenches, utility knives, torches, tin snips, tape measures, table saws, handsaws and hacksaws. Connie Boettcher, presiding over this arsenal assembled by her husband and a middle school teacher, maintained contact via walkie-talkie with the two site supervisors and Bob Leathers.

On Saturday, sunny and warm, 350 volunteers buzzed with news. Real estate agent Lee Niederhauser had told Roberta Ringold, the school superintendent's wife, that she had just sold a house to clients impressed by the playgrounds and the community's spirit.

"I knew we could do it, but I didn't think we could do it this well," commented Stephanie Frantz, holding a hammer. "Did you know that a grandparent donated the oak tree that became the big beam to hold up that tire swing? And I've learned to use tools my husband said I never could."

"I figure I'll use this playground lots," said Ebe Boettcher (p. 107). "I'd say I'll use the castle the most, because it's going to be pretty huge."

Tall, blond Ed Bjork, an architectural hardware consultant, having finished work atop one of the castle's towers, took a shortcut and whizzed down a just-assembled slide. Resting from hammering, David Loebsack, a political science professor at the college, mentioned that he had been doing research on Kenya. "They have a kind of community barn raising there, too, and they have a word for it—*harambee*," he said. "I've lived in Tokyo and Chicago, but I'll take this," said Don Typer, the retired president of Doane College in Nebraska. Iowa Department of Transportation special investigator Kerry Kirkpatrick, who had developed a decided limp as the project progressed, said, "It hurts, but it hurts good."

And then it was Sunday evening, the community had counted down in unison, the kids had charged onto the completed playground, and the project was over. Long after dark, with children still rampaging through the playground, after the celebratory potluck supper, the standing ovation for Bob Leathers, Barry Segal and Ernie Bayles, and the presentations of memento T-shirts ("Mt. Vernon: One Hill of a Town"), everybody stood around looking giddy and dazed.

Bob Leathers swung on a suspended tire, watching the kids swarm over the playground and grinning beatifically. "I'm already experiencing postplayground letdown," sighed attorney Darrel Morf. Tom Wilkinson, a foreman at Rockwell Graphics, had a cure.

"I hear they're working on a project just like this in Portland, Maine," he said, watching his children climbing the towers under the lights, jouncing across the rubber bridge and hanging from a horizontal ladder. "I think I may take my vacation up there next autumn and give them a hand."

Catherine Hileman, two, squirms out of tire ladder. Steven Steggall, on the mark, eagerly awaits his turn.

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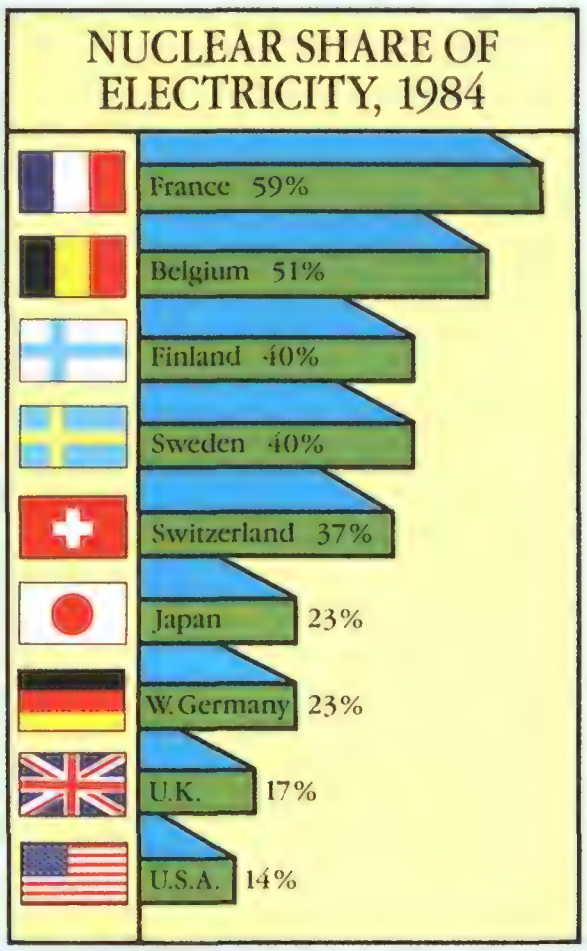

Many countries are relying on more nuclear electricity to lessen their dependence on foreign oil. Source: International Atomic Energy Agency.

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By Andy Park

Is this toothy relic still on the prowl in Tasmania's wilds?

A number of 'tiger hunters' are searching for proof that the fabled thylacine is not extinct

The island of Tasmania, which together with a number of other islands makes up the smallest state of the Commonwealth of Australia, lies about 150 miles south of the continental mainland. It is named after the Dutch explorer Abel Janszoon Tasman, who discovered it in 1642 after his epic voyage across the Indian Ocean. At that time, the island was home to several tribes of aboriginals and a wolflike marsupial that would eventually be called the thylacine, or Tasmanian tiger. After coexisting there for thousands of years, both man and beast were destined to suffer a similar misfortune. Disease and conflict with European settlers led to the demise of Tasmania's full-blooded natives by the late 1870s. The introduction of competing animals, along with habitat destruction and the depredations of bounty hunters, decimated the tiger. The last one known to exist died in captivity in 1936, by which time the species' likeness had been prominently incorporated into Tasmania's coat of arms (p.121).

Today there is precious little evidence to indicate that the tiger has escaped extinction but, as I discov-

On 1920s zoo film, a lanky Tasmanian tiger displays huge gape of powerful jaws.

ered for myself while on a holiday visit to Tasmania last year, a number of perfectly respectable scientists and conservationists are convinced that the animal still survives in the wild. In fact, the newspapers were full of stories about the latest "tiger hunt" in the remote northwestern end of the central highlands shortly after I arrived. "Forget it," my host scoffed. "It's our abominable snowman. Someone is always searching but no one ever finds anything." Intrigued, I went down to the Queen Victoria Museum in Launceston, Tasmania's second-largest city with a population of 64,000, to see curator Robert Green. A zoologist, Green had been quoted in one of the newspaper articles. "I reckon there are a few tigers left," he told me with a twinkle in his blue eyes and a scratch of his bushy gray beard. "A few dozen, maybe. Must be at least that many, or they'd have died out."

I wasn't sure whether Green really believed that, but our conversation, together with some subsequent digging into the tiger's history, certainly aroused my curiosity. I was hooked. Long after my Tasmanian holiday was over, I continued to stay in touch with the thylacine situation. I returned to the island four times to interview experts. Eventually I even managed to join up with that northwestern expedition the newspapers had been so excited about.

The object of all this attention stands about 23 inches tall at the shoulders and weighs, on the average, 67 pounds. It is sandy-yellow in color with 15 to 20 dark stripes on its back and stiff tail. Its enormous mouth contains 46 teeth (most domestic dogs have only 42) and its jaws can crunch right through the bones of prey. Its head is nearly as large as a timber wolf's, but the wolf's brain is almost three times as large as the tiger's.

The thylacine is the world's largest carnivorous marsupial. Marsupials, as every schoolchild knows, have external pouches in which their young develop. Other members of the order include the American opossum, the Australian possum, kangaroos, wallabies, wombats and koalas. The greatest concentrations of marsupials are found in Australia and New Guinea; once, the thylacine was widespread in those countries, too.

Thylacine lairs have been discovered in rocky caves, hollows beneath the bases of large forest eucalyptus trees, and under fern fronds in thickets. Tasmania's dominant indigenous predator, the tiger is nocturnal, or at least seminocturnal. It re-

Hunters hold up a young thylacine killed around 1913. The stiff tail and prominent stripes on back are characteristic of the species.

Educated in the United States, Andy Park works as a writer and a photographer in Sydney, Australia.

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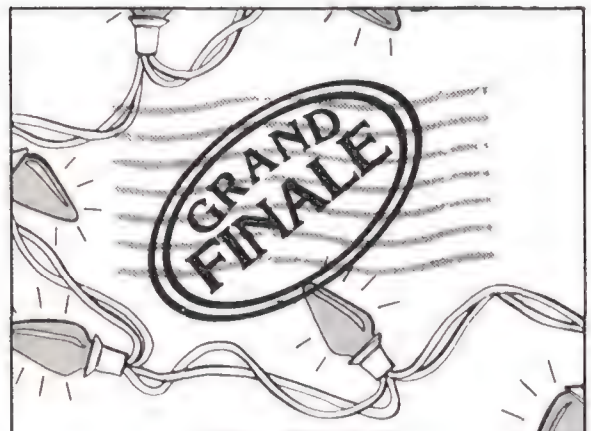

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Adult and three cubs were photographed about 1920 at a private zoo near Hobart. The last captive thylacine died at same zoo in 1936.

lies on an apparently incredible sense of smell and tireless tracking ability to run its prey down. Many sightings have occurred while a tiger was hot on the trail of a sheep or a wallaby, concentrating so single-mindedly on the task that it was oblivious to human observers nearby.

One of the most compelling aspects of the tiger's story is the number of sightings that have been reported over the years—more than 300, by one reckoning, since 1936. Some of the eyewitness accounts have been recorded in extraordinary detail.

In 1970, six respected citizens of a farming community in the northeast were traveling home together on a road between Scottsdale and Launceston. Shortly after midnight, they saw an animal "about the size of a sheep dog" cross the road in front of their car "half trotting and half walking." The animal was striped across the hindquarters and the tail "was very thick at the base and carried straight off the body, unlike the tail of any other animal." Everyone in the car was quite familiar with Tasmanian fauna and there was no doubt in anyone's mind that the creature that had crossed their path was a thylacine.

Two local policemen driving home one night in 1977 had to brake suddenly on a lonely road in the northeastern part of the state to avoid a striped, doglike animal. Both officers filed reports to the Police Commissioner about the incident. They were certain the animal was a thylacine.

One of the most convincing of recent sightings was made on a rainy night in March 1982 by a ranger with the Tasmania National Parks and Wildlife Service (TNPWS). He had gone to sleep in the back of his vehicle, which was parked in a remote forested area in the northwest. He awoke and scanned his surroundings with a spotlight, which illuminated a tiger six or seven meters away. "It was an adult male in excellent condition with 12 black stripes on a sandy coat," he reported. "Eye reflection

was a pale yellow. It moved only once, opening its jaw and showing its teeth." After the animal disappeared into the underbrush, the ranger left his vehicle and noticed a strong scent. The heavy rain obliterated any tracks the creature might have left.

Although many observations of the tiger have been made by ostensibly reliable witnesses, this kind of information does not enjoy much credibility in scientific circles these days. And not without good reason. Sightings of the abominable snowman, the Loch Ness monster, Sasquatch and a number of other supposed relics are reported with monotonous regularity, and often in convincing detail. Despite the fairly elaborate efforts of a number of investigators over the years, nothing has ever been turned up to prove that any of these sensational beasts still exist. There is, however, an important distinction to be made when it comes to the Tasmanian tiger. Unlike the Loch Ness monster and others of that ilk, the thylacine's prior existence is a matter of scientific record. Fossilized remains have been found in every Australian state, and a well-preserved mummy was discovered in a cave on the Nullarbor Plain.

Tasmania was separated from Australia about 12,000 years ago, at the end of the last Ice Age. Thylacines became extinct on the mainland close to 2,500 years ago, due to climatic changes and the introduction

Rearing tigers embellish Tasmania's coat of arms, granted by King George in 1917.

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Trying for tiger photos, zoologist Eric Guiler sets camera system on game trail.

by aboriginals of the dingo, a wild dog that competed for food. On Tasmania, the species' only competitors were the island's aboriginals, who fancied the thylacine as an occasional delicacy but subsisted mainly on wallabies, possums, plants, birds and shellfish. It took a European-style civilization to push the thylacine to the brink of extinction.

Originally called Van Diemen's Land after a governor of the Dutch East Indies, Tasmania was settled by British farmers and tradesmen from New South Wales in Australia in 1803. It was also used as a repository for uncontrollable convicts. The first report of a thylacine killing was filed in 1805 by Lt. Gov. William Paterson with the Sydney *Gazette*: "An animal of a truly singular and nouvel description was killed by dogs the 30th of March on a hill immediately contiguous to the settlement at Yorkton, Port Dalrymple . . . it must be considered of a species perfectly distinct from any animal creation hitherto known, and certainly the only powerful and terrific of the carniverous and voracious tribe yet discovered on any part of New Holland [Australia] or its adjacent islands."

Only four thylacines were seen in the first 17 years of European settlement. The animals were very shy and usually avoided people. The few that

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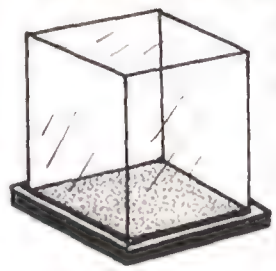

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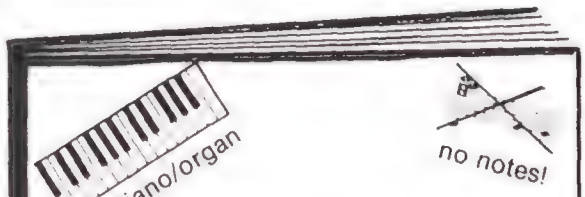

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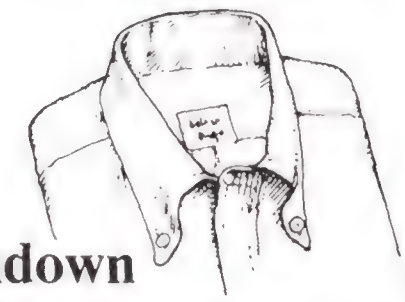

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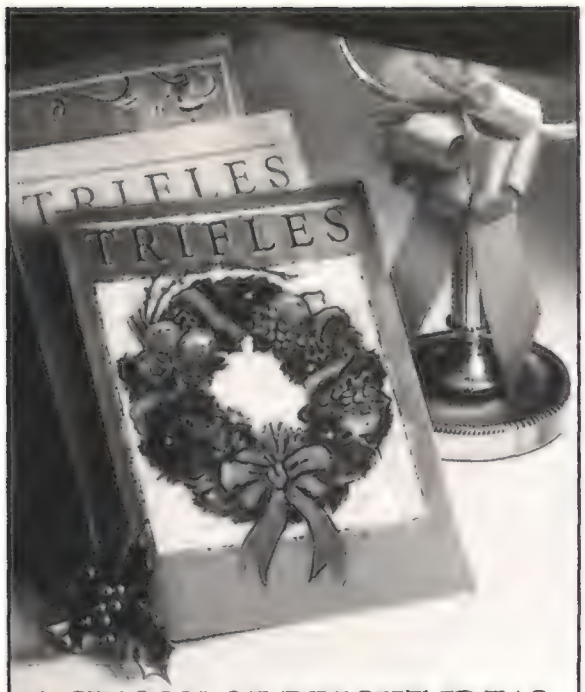

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were caught fascinated early scientists who dubbed them "opossum-hyena" or "zebra opossum" in recognition of their marsupial heritage. Detailed anatomical studies were made; skins and skulls were sent to museums and universities around the world. But little was learned about the elusive creatures' behavior or range.

By the 1830s, the sheep industry in Tasmania was well-established and thylacines were a well-known killer of sheep. The Van Diemen's Land Company, which started the island's livestock industry, introduced a bounty on the properties under its control in 1840. Later, the government bowed to pressures from graziers and introduced a bounty of its own. To make matters even worse for the thylacine, there was a growing demand for its hide. One tannery in Tasmania exported 3,482 skins to London between 1878 and 1896. At least 4,800 of the animals were killed between 1878 and 1909, an appalling rate of attrition for such a rare species.

As early as the mid-1800s, some naturalists were expressing serious concerns. One of them wrote: "When the comparatively small island of Tasmania [total area: 25,000 square miles] becomes more densely populated, and its primitive forests are intersected with roads from the eastern to western coast, the numbers of this singular animal will speedily diminish, extermination will have its full sway. . . ." In 1909, that grim prophecy seemed close to fulfillment. Only two bounties were paid on thylacines that year and the animals were scarce even in areas where they apparently had withstood 50 years of trapping. That cataclysmic decline suggested something else at work besides bounty hunting and the skin trade—possibly an epidemic of a disease like distemper or mange. The Tasmanian devil, a smaller carnivorous marsupial (p. 128), suffered a similar population drop even though it had not been subjected to the same degree of persecution. More than 70 years ago, Mrs.

Mary Grant Roberts, owner of a private zoo near Hobart renowned for its success with captive thylacines, reported some inexplicable losses among her newly acquired tigers and she had trouble replacing them. The cause or causes of that sudden decline have never been identified.

The death in 1936 of the last captive thylacine at Mrs. Roberts' zoo—which by that time had been taken over by the Hobart City Council—raised an obvious question. Were isolated populations still surviving in the virtually impenetrable forests of the island, as some reports suggested? The responsible government agency of the time, the Animals and Birds Protection Board—a predecessor of the TNPWS—initiated several of the dozen or so thylacine searches that were undertaken in the next five decades. None has provided any concrete proof of the animals' survival. But the quest goes on.

Confirmation of the thylacine's existence would put the TNPWS in a very tricky situation. Director Peter Murrell would be responsible for implementing a management plan to safeguard an animal about which very little is known. Land would have to be allocated for the tiger's protection, which would involve reclamation of privately owned areas by the

Expedition leader Peter Wright (left) and assistant measure tracks in the snow.

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state. That would not be popular among landholders. If, on the other hand, public land were set aside, the state could lose considerable revenue in timber, wood-waste and mineral rights. But Murrell is confident that the situation will sort itself out when, or if, a thylacine is photographed, captured or documented in some other way. "I think the tiger will probably be found by accident," he says, "maybe by a fast-thinking tourist with a camera. The planned efforts are too hit or miss. This animal is very shy, very scarce, and the few that may exist probably have a large hunting territory."

Helicopter deposits a load of lumber for construction of headquarters facility on tiger-search site in Tasmania's remote central highlands.

As a research officer with the TNPWS, biologist Nick Mooney follows up the more "positive" thylacine sightings. When Mooney investigates a new report, he looks for established trails in the area where the animal was spotted. If the ground is poor for tracking, he may spread buckets of fine sand across the trails. Early-morning examination of the sanded areas reveals the animal traffic of the night before. The biggest problem is congestion. "I've had a few good prints," Mooney told me, "but the wallabies and devils are about in such great numbers that positive identification is extremely difficult. The prints overlap."

Like any good researcher, Mooney is cautious in his remarks about the thylacine's actual existence in the absence of scientific proof. But he is privately convinced that it is just a matter of time before a photograph is taken. This view is shared by Eric Guiler, an Irish-born zoologist and retired Dean of Science at the University of Tasmania.

Guiler has been involved in most of the thylacine searches since the late 1950s, has made investigations of his own and often follows up sightings with Nick Mooney. He has also pioneered in the use of self-triggering camera systems to try for pictures of a thylacine, rather than attempting to snare a specimen, which would probably result in the animal's death. Guiler connected an infrared beam,

aimed across a game trail to a movie camera outfitted with lights and mounted on a metal post. When an animal interrupted the beam, the camera shot a few frames and then stopped, awaiting another passerby.

Six years ago, the Australian branch of the World Wildlife Fund gave a grant of $55,000 to look for the thylacine. Guiler and researcher Steven Smith deployed their cameras and investigated the whole question of the thylacine's disappearance. The result of their work was a 133-page report by Smith, which concluded that "the probability of thylacine survival must now be considered remote," and a selection of wild-animal photographs, which demonstrated the effectiveness of Guiler's technique but did not include a thylacine. Guiler was disappointed but not discouraged. "Some of my colleagues think I'm crazy," he admits, "but the eyewitness accounts keep me going."

Steven Smith dealt with the eyewitness phenomenon in his research. Sightings, he found, have increased markedly over the past 20 years. "The distribution of tiger sightings is concentrated in certain areas," he says. "They're not random. Of course, when someone is going through an area where tigers have been reported before, it would be interesting to know how much that influences what they are likely to see. That would be a research project in itself."

The skeptics remain unconvinced. Petrina Quinn, a rural reporter for the Australian Broadcasting Corporation, is one of them. "Tigers are carnivorous," she says, "yet there are no reports of attacks on domestic animals, even on isolated properties in areas where they were known to exist. If the animal is on the increase, surely there would be predation of stock as there was in the past."

Dick Smith, an Australian explorer and adventurer, is also doubtful. "People see what they want to see," he says. "When American scientists were looking for the Loch Ness mon-

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A Tasmanian devil (left) bares its impressive teeth while a spotted native cat takes a more relaxed view of camera. Both animals are marsupials.

ster in Scotland several years ago, with all that sonar equipment, there were dozens of sightings of the creature by the public. Yet the scientists drew a blank. The tiger is in this same category."

The most grandiose tiger hunt of them all was launched last year under the direction of a flamboyant Tasmanian animal lover and tourist entrepreneur named Peter Wright. This was the search that first attracted my attention in the newspapers. Earlier, the American media magnate Ted Turner had offered a $100,000 reward for proof of the tiger's existence and Wright claimed that another media chief had promised to pay more than twice that much for the exclusive use of tiger photographs and film.

Wright introduced a new dimension to tiger hunting—promotion. He widely publicized his $250,000 commitment to the search. And what a search it was! The expedition included a helicopter; a barnlike mountain headquarters facility built entirely of air-lifted materials; ten remotely monitored, self-triggering cameras; sound-sensing equipment; a battery of computers; and a team of nearly a dozen technicians, biologists, carpenters and bushmen.

Wright was supremely confident that he would photograph a thylacine on his first attempt mainly because of the search area he had chosen. Located near Lake Adelaide in Tasmania's central highlands, the area is a sheltered hollow nearly 1,000 feet below the high plateaus. It is a perfect winter habitat for both the thylacine (sightings have been frequent over the years) and its plant-eating prey. When the winter gales begin and snow blankets the higher elevations, wallabies move down into the calm of the hollow to graze. The thylacines should move in after them.

Wright invited me to visit the site and, at the beginning of the southern winter, I made the first of a dozen helicopter trips up there. Snow clouds hung ominously over the Great Western Tiers as we approached the spectacular 120-mile-long escarpment through a drizzly rain. Pilot Graeme Burdach aimed the craft toward a horizontal slot of clear sky beneath the clouds and above the cliffs. I held my breath as we sailed through and then I settled down to enjoy the scenery. The high plateau of the Tiers spread out below us, lightly dusted with fresh snow. The rocky plains had only a thin carpet of vegetation; there wasn't a tree or even a bush in sight. We finally cleared the high country and descended into densely-wooded valleys. The vegetation all looked the same to me, mostly eucalyptus broken by occasional patches of bog stretching endlessly into the mist.

Without warning, Burdach swerved to the right and pointed down. In a tiny clearing there were three little tin tool sheds shining silver against the green of the bush. As we dropped down to land, I saw the framework of the headquarters barn with several carpenters hammering away. They looked up as we landed on the minuscule "helipad" amid towering columns of motor-blown snow. I scrambled out and gave the thumbs-up signal to Burdach. He twisted the throttle and climbed back into the

Among the creatures photographed at night by expedition game-trail cameras was a common brushtail possum investigating a reflector.

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I didn't do much exploring on that first trip—just hung around the camp getting the feel of the place. Later, when the barn was finished, I went back up to spend a few days and started exploring the search area in earnest. The boundaries of the site were set by several cliffs and two narrow lakes, Louise (below) and Adelaide. On the plateau above this pocket of calm, the winds raged unrestrained. Within the search area, small ridges cloaked with tangles of stunted eucalyptus trees provided vantage points over boggy meadows of sphagnum moss and coral fern. After a storm, the snow-covered bogs were crisscrossed with tracks of possums, wombats, wallabies and other thylacine prey.

Near one end of Lake Adelaide was a natural land bridge that served, in effect, as a game highway. After one early snowstorm, Wright and one of his roustabouts found some tracks on the bridge that strongly suggested a thylacine. That find excited us, and made us even more impatient for the arrival of the long-overdue cameras and computer equipment.

The plan was to station the computer monitors in the barn. They would be hooked up by radio to the ten cameras set up in the search area. When an infrared triggering beam was broken by an animal, that particular camera-and-flash would go off, and a signal would be sent to the computer. The monitors would report on how often each camera worked. They would also supply readouts of battery power and available film for each camera.

It all sounded fine in theory but the computers, as it turned out, were full of problems. They were eventually sent back for redesigning and by the time various other problems were ironed out of the camera systems, only six weeks of winter remained. Soon, much of the wildlife in the search area—including, presumably, the tigers—would be spreading out and heading back up to higher elevations. Wright decided to set up the cameras anyway and leave them on site for a few extra weeks. The camera equipment worked well. A number of animals were photographed (p.128) but the thylacine was not among them.

At this writing, there is a question about Wright's financial ability to mount another try anytime soon. Guiler, however, continues to search for thylacines, having deployed cameras in several locations recently. Buoyed by new reports of sightings, he stays in close touch with Mooney and others at the TNPWS and remains confident that, one of these days, he will prove that the Tasmanian tiger still haunts the wilds.

I hope that one of Tasmania's tiger hunters succeeds. In a world that daily becomes ever more inhospitable to wildlife, the primitive old thylacine seems, to me at least, to symbolize the gritty spirit of survival. Even if all searches fail, I will salvage a certain amount of comfort from the thought that this old-fashioned marsupial has somehow been able to elude all of the technology that the 20th century has been able to throw at it—if, that is, it is there at all.

One of two lakes in the search area, Louise abuts the sheltered winter habitat where many thylacine sightings have been reported.

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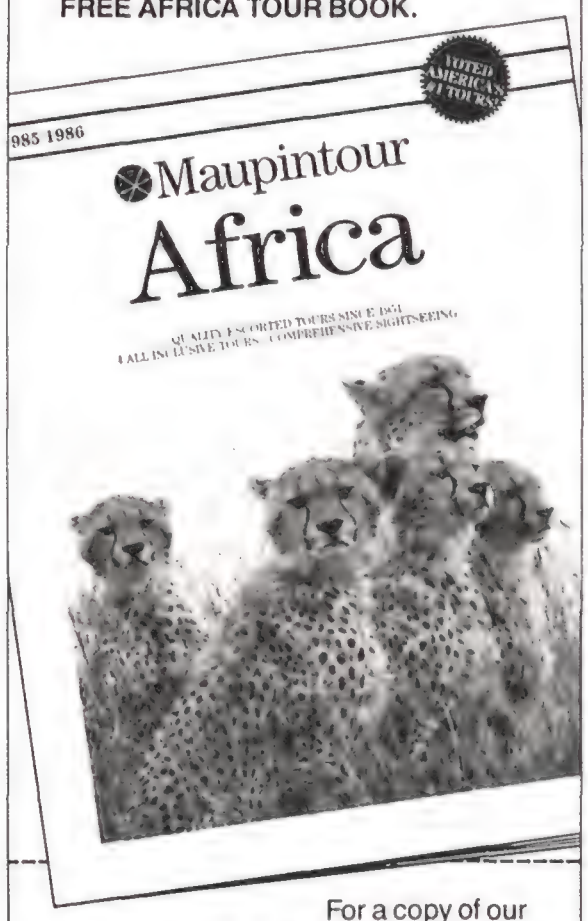

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Book reviews

Bernard Shaw: Collected Letters 1911-1925
Edited by Dan H. Laurence
Viking, $45

This third volume of the *Collected Letters*, handsomely illustrated and decently annotated, takes us from Shaw's late middle age to the verge of old age. The dramatist moves from *Pygmalion* through the elaborate lengths of *Back to Methuselah* and then to the new spring of strong simplicity in *St. Joan*.

Shaw's love letters to Mrs. Patrick Campbell, his "Stella" (he has his "Stella" like Swift, an evident model), enliven the early part of the volume. We may miss her responses, but Shaw's letters to his love are here entertainingly juxtaposed with letters to other people boasting of the affair. He tells Harley Granville Barker: "All yesterday I could think of nothing but a thousand scenes of which she was the heroine and I the hero. And I am on the verge of 56. There has never been anything so ridiculous, or so delightful, in the history of the world."

His own urge to kiss and tell didn't prevent him from being furious when Mrs. Pat later decided to publish some of his epistles. But in 1912-13 "playing Romeo" was a means of defying middle age. Shaw protests too much when, in one of his sonnets to Stella, he asserts "Yet he [GBS] was not a bit like Peter Pan/ For Peter had no heart; but this poor waif/ Trembled with love and music." Barrie's play evidently had made some impression on him. There really was a Peter Pan in Shaw, as he knew.

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the courage of his own convictions. Detesting the war as the absurd offspring of imperialism and degenerate politicians, he was yet no simple pacifist. Shaw's unpopular opinions on the war had led to his expulsion from the Dramatists' Club, an unreasonable proceeding, as Shaw points out in dignified letters that show him at his best.

He is not as good at bearing the pain of others. Egotism creeps into condolence. To St. John Ervine who lost a leg in 1918, Shaw wrote a long account of his own foot trouble in 1898, concluding, "You will be in a stronger position. I had to feed and nurse the useless leg." The recipients of such letters may have put them aside until they felt stronger.

We who are not intended recipients can enjoy all the letters, including the masterly rejection of a spendthrift's request for a loan: "I am reasonably goodnatured to the weak-minded when they have engaging artistic qualities; but I am not likely to spend an appreciable part of my life pouring water into a bucket with a hole in it. Remember: I am old; and you are not the first."

In every letter Shaw discovers some of his genius for creating GBS. His comments on his own plays and on the business of putting them on are shrewd and businesslike; he understood his works' public life. Shaw made himself into the public man, and we can see him here continually hammering the Irish sage out of his Irish Peter Pan (or vice versa), not without intimations of mortality. Shaw in his 60s thought he was near his end. We can be glad that the shining, irritable voice did not cease to sound in 1925, where this volume ends. There must be at least one more volume to follow.

Margaret Doody
Novelist and literary critic

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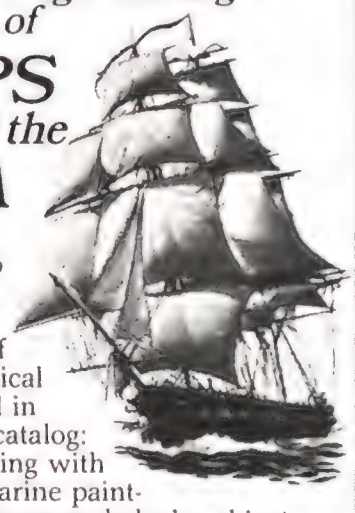

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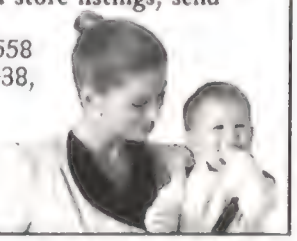

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Well aware of his gifts and sophistication, he made a point of applying European architectural and engineering standards to his adopted country. Among his architectural projects were the completion of the U.S. Capitol in Washington and designs for the Greek Revival Bank of Pennsylvania in Philadelphia, the Gothic Revival Sedgeley house just outside the same city, and his masterpiece, the Roman Catholic Cathedral of Baltimore. His engineering projects included the country's first full-scale steam-powered waterworks in Philadelphia.

Latrobe the naturalist made meticulous observations of animal—and particularly insect—behavior. His was the first scientifically complete description of the alewife; an effort is under way to add his name, as official classifier, to its Latin designation.

The present volume, part of a project to publish Latrobe's papers undertaken by Yale University Press on behalf of the Maryland Historical Society, is primarily pictorial, with selected commentary from his journals and sketchbooks. But since Latrobe avidly sketched whatever interested him, the book's 165 plates and maps represent a cross section of his multilayered career. Here are survey sketches, scientific renderings, still lifes, nature scenes and genre paintings.

Latrobe was an adherent of the sublime movement, which held that stupendous natural wonders were a source of such ennobling awe that artists could hardly find worthier subjects. But nothing fascinated him like unnatural sublimity, especially that of grand houses and public works, and he lavished his considerable skills as a colorist and his savvy as a designer on depictions of Mt. Vernon and the Warwick Iron Furnace, where plates for Franklin stoves were cast.

Most affecting, however, are the genre scenes, most of them unfinished sketches: courtrooms, slaves, poor whites, men playing billiards, and a marvelous drawing of the first elephant in America. She was so valuable, the editors remark, that the circus customarily traveled by night to foil those seeking a free look at her.

Latrobe was an infectiously zesty chronicler of his travels. He can summon boyish enthusiasm for even the homeliest of creatures, such as the longnose gar, of which he writes: "The whole of their structure is wond[er]fully adapted to their mode of life and the catching of their food in shallow water." He has a sense of humor, as when he calls the members of the Pennsylvania Assembly "the true original ugly Club."

This book is a pleasure to read and peruse. The plates are of the highest quality, and the editing is scholarly without being obtrusive. The editors spent many hours tramping over ground Latrobe walked. Too often they are obliged to report this house razed or that view compromised. All the more reason to be grateful that Latrobe was on the scene, with so much skill and youthful brio.

Dennis Drabelle
Washington attorney and writer

The New Guide to Modern World Literature
Martin Seymour-Smith
Peter Bedrick Books, $39.95; $60 after December 31, 1985

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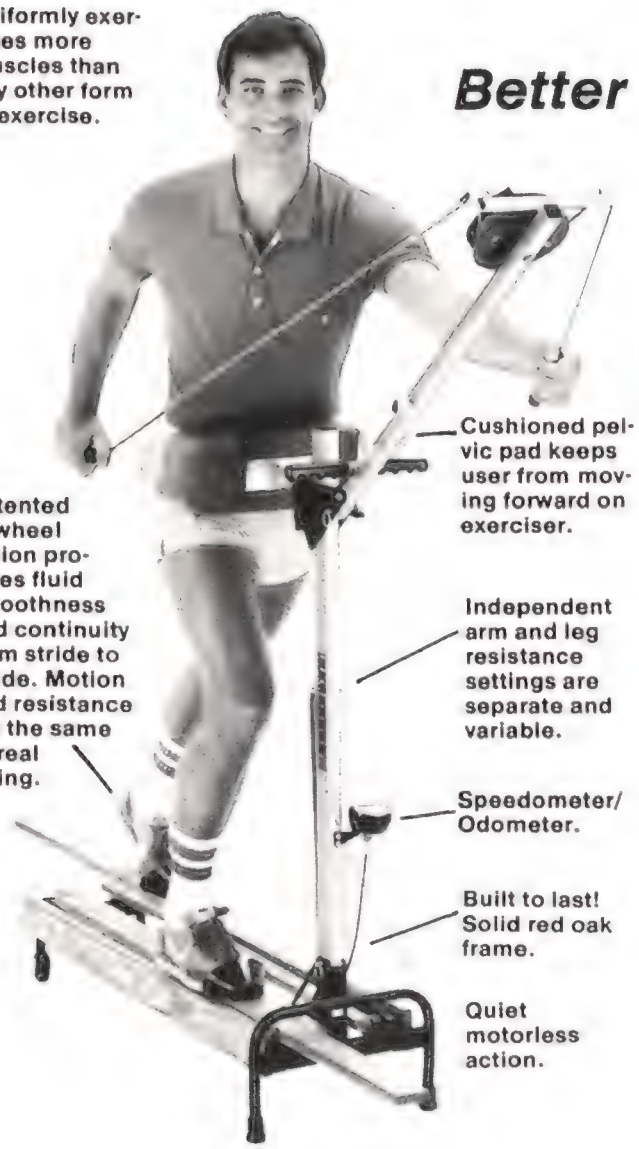
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ment agency—dull, graceless paragraphs interrupted only by moments of pretentiousness. But not Martin Seymour-Smith's *New Guide to Modern World Literature*. This 1,400-page labor of love (now in its third, much expanded, edition) instead offers one man's opinion of virtually every significant writer of the 20th century. And not just American or English poets, novelists and playwrights. Here is God's plenty: surveys of Finnish literature, considered pieces on overrated and underrated books from China, Turkey and Yugoslavia.

What makes this guide so much fun to browse through is that Seymour-Smith fearlessly expresses what he calls his often "unorthodox views." T.S. Eliot, for instance, "is a minor poet: he cannot write about love; he lacks real sympathy, or empathy; he is frigid. . . . Skill, accomplishment, sensibility—even these are not enough to make a major poet. Emotional substance is needed." Many readers will rankle at this judgment (I do), while also recognizing that, yes, Eliot might be regarded as such a cold fish. *The New Guide* may thus infuriate as much as it informs, but it is never less than passionate about literature—and that redeems all.

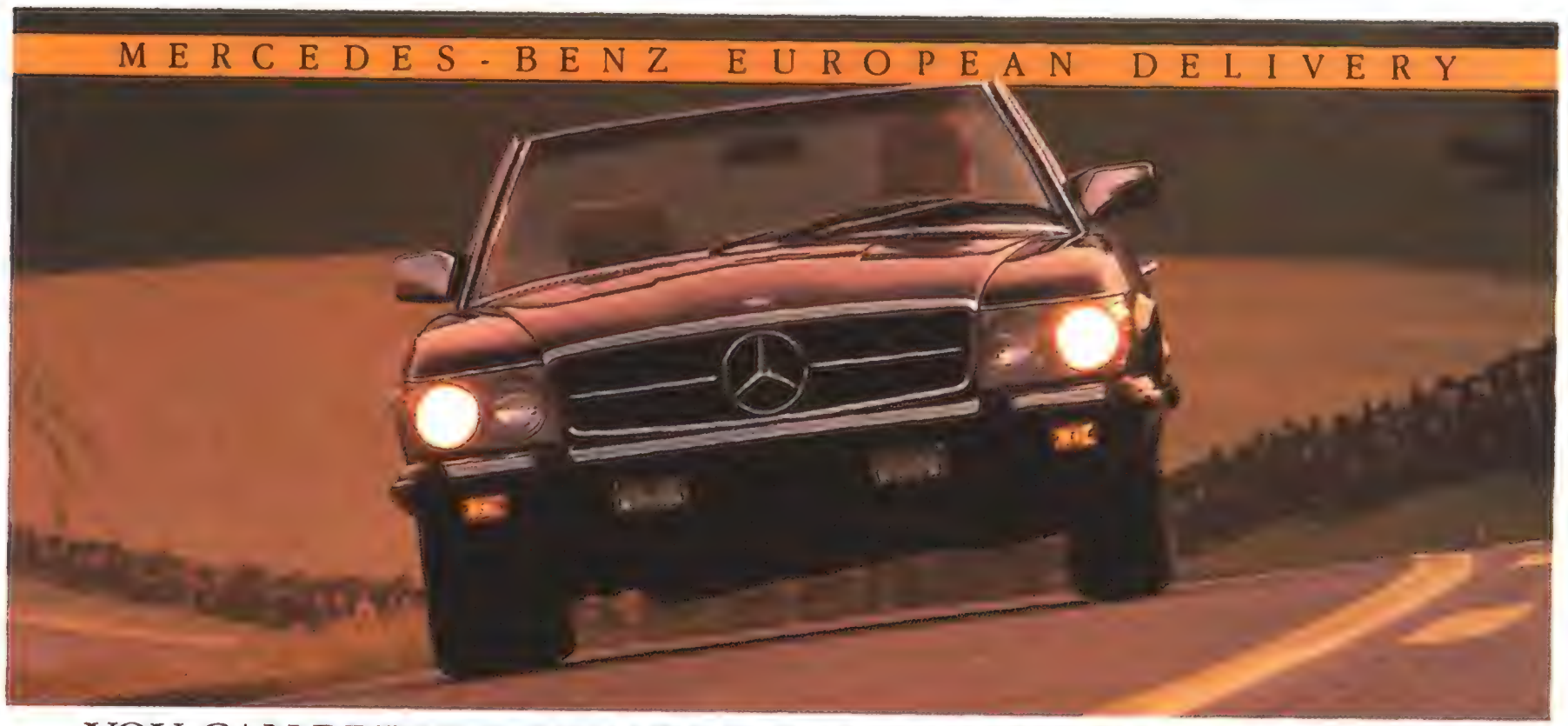
The range of Martin Seymour-Smith's reading is at once staggering and inspiring. Indeed, the book's most important use will be to lead readers to underappreciated or unfamiliar writers. Céline, Carlo Emilo Gadda, Robert Musil—to name only giants—are available in English, yet how many of us have read their books? And even in our own language, Seymour-Smith reminds us, we neglect George Moore, Isak Dinesen, Wyndham Lewis and Walter de la Mare, while singing hosannas to Joyce and Yeats.

In reading around the guide its biases quickly become apparent: Seymour-Smith generally prefers artists who are grounded in "Life" (and disparages intellectual playfulness like Tom Stoppard's); he cannot understand contemporary appeal of horror fiction à la Stephen King; and he is fascinated by the psychology and sexual lives of writers. Many modernists, he persuasively maintains, are haunted by *Künstlerschuld*, or "artist-guilt"—a recurrent sense that "literature fulfils no useful, but only a selfish function." In discussing Lévi-Strauss, Seymour-Smith also elaborates the fertile notion of *bricolage*—the idea that true artistic creation is based not on craftsmanship but on making do with "whatever is at hand."

A kind of *bricolage* characterizes this encyclopedia, which, to bolster its brilliance merits a more thorough index—and closer proofreading. To look at examples: the critic John Middleton Murry has somehow become Murray; Ted Hughes' first book is wrongly called *The Hawk and the Rain* instead of *The Hawk in the Rain*. Such small errors mar this otherwise impressive enterprise.

Of course, researchers who want the received opinion probably should stick to the Oxford Companions to various national literatures. But for those adventurous souls who actually want to explore unfamiliar literary territory, *The New Guide* shares an honored place with such brilliant, crotchety and readable grab bags as Ford Madox Ford's *The March of Literature* and Cyril Connolly's *The Modern Movement*.

Michael Dirda
Editor at *Washington Post Book World*



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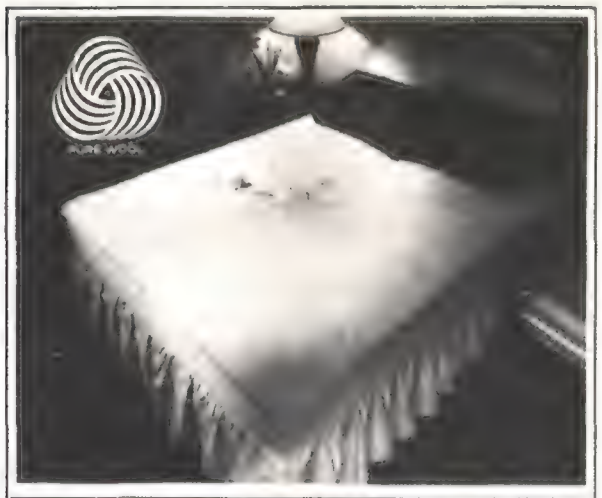

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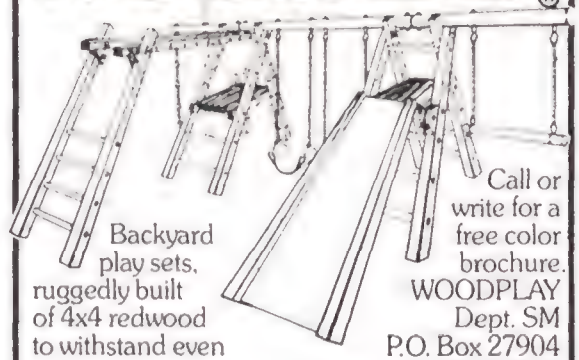

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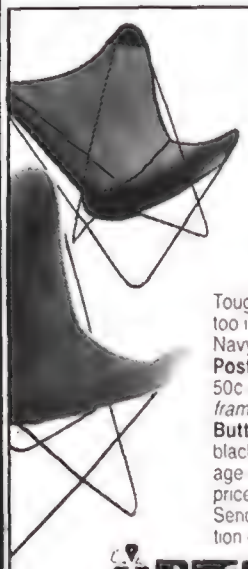

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Nature's Forms/Nature's Forces: The Art of Alexandre Hogue (paper, $19.95)

To order, send check or money order to Museum Shops, Box 44083, Washington, D.C. 20026-0083. Include 15 percent of total purchase to cover postage and handling (minimum, $1.75).

The 1986 Washington Craft Show: a call for applications

Crafts artists nationwide are invited to apply for inclusion in the Smithsonian's fourth annual juried Craft Show, sponsored by the Women's Committee of the Smithsonian Associates. It will be held April 18-20, 1986, in the Departmental Auditorium in Washington, D.C. Application forms, which must be postmarked by October 11, 1985, may be obtained by writing to: Women's Committee, A&I 1278, Smithsonian, Washington, D.C. 20560, or by calling (202) 357-4000. Applications must include five color slides and a nonrefundable fee of $20.

Resident Associate events

To become a Resident Associate, or to find out about the many other activities presented monthly, or for fee and ticket information, call 357-3030. Here are some August events:

Roman Holiday (August 7, 14, 21, 28; 8 P.M.) Italian film series, including *Mi Mande Picone* and *Il Bacio della Tosca.*

Excavations at Flowerdew Hundred (August 8; 8 P.M.) Slide lecture by James Deetz.

The East Thirteenth Street Band (August 10; 7:30 P.M.) Performance by jazz ensemble formed by artist Larry Rivers.

The Best of Charlie Chaplin (August 13, 20; 8 P.M.) Screenings of *City Lights* and *The Gold Rush.*

A Classy Evening of Tap (August 14; 8 P.M.) LaVaughn Robinson and the Philadelphia Tap Dancers and the Tap Quartet of Washington, D.C., perform.

Red Murphy & Company (August 21; 7 P.M.) Florida bluegrass band entertains for picnickers; wine and soft drinks served.

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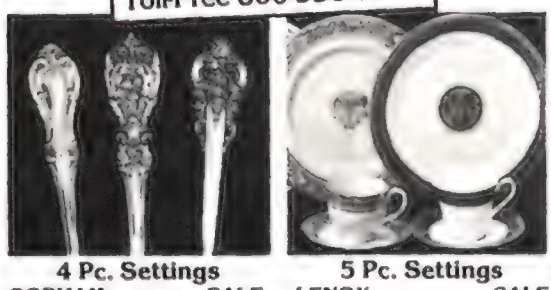

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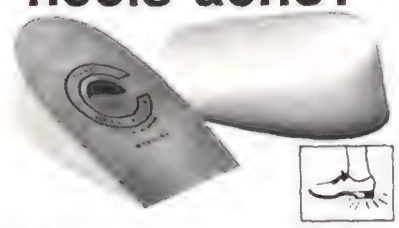

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Radio Smithsonian: features on this weekly half-hour series include a Smithsonian popular music collection and the African "bee-eater bird."
Smithsonian Galaxy: short radio features explore history, science, art.
Here at the Smithsonian . . .: short TV features look at the Wright Flyer restoration and African art.
Smithsonian World: PBS television rebroadcasts at 9 P.M. include "Crossing the Distance" (August 5), "Speaking Without Words" (August 12).

To find out what stations in your area carry these programs, write: Office of Telecommunications, MNH C222B, Washington, D.C. 20560.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community write: SITES, Smithsonian Institution, Washington, D.C. 20560. Some August exhibits:
Tucson (August 11-November 22) *An Age of Gold: Three Centuries of Painting from Old Ecuador*, Tucson Museum of Art.
Oakland, California (August 17-October 27) *Yesterday's Tomorrows: Past Visions of the American Future*, Oakland Museum.
Logan, Kansas (August 3-September 29) *Radiance and Virtue: The R. Norris Shreve Collection of Chinese Jade*, Dane G. Hansen Memorial Museum.

Planning a Smithsonian visit?

Get a head start—send a postcard request or call for a free previsit planning packet: Visitor Information and Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560; (202) 357-2700 or TDD for hearing impaired (202) 357-1729.

Visiting members' benefits

During summer months, begin your visit at the Associates' Reception Desk in the Smithsonian castle anytime between 9 A.M. and 4 P.M. daily. Here your welcome will include helpful printed materials in a handy Associates' bag as well as full details on visiting members' benefits. Early birds can save time and steps by attending a 9:30 A.M. orientation that presents the latest information on exhibitions and activities in the Smithsonian's 13 museums and the National Zoo.

Highlights continued

Quenching thirst with artistry

Zuni hunters and pilgrims had to carry water on long desert trips, but their potters made the best of it

"Gifts of Mother Earth: Ceramics in the Zuni Tradition," on view at NMNH through next summer, contains 90 bowls, jars, cooking pots and the many other vessels that served this Southwest Indian tribe in their everyday life. Collected for the Smithsonian by anthropologists in the 19th and early 20th centuries, most of them are fairly standard in shape. But not the canteens, which were used, usually by men, to carry water while they worked at sheep camp, hunted and made religious pilgrimages.

The basic canteen shape, simple and globular with two carrying handles, is joined in this show by versions that are barrel-shaped, double-lobed—one is even modeled as a duck. With its cylindrical form, the barrel canteen was easily wrapped in a blanket and tied around the waist, leaving the owner free to hunt; while the elaborate double-lobed model was probably carried only on certain religious pilgrimages. Whether the duck, one of several animal-shaped canteens in the show, had a special use is not known. It is likely, though, that whatever canteen a Zuni used, the water tasted better than it does from the tap.

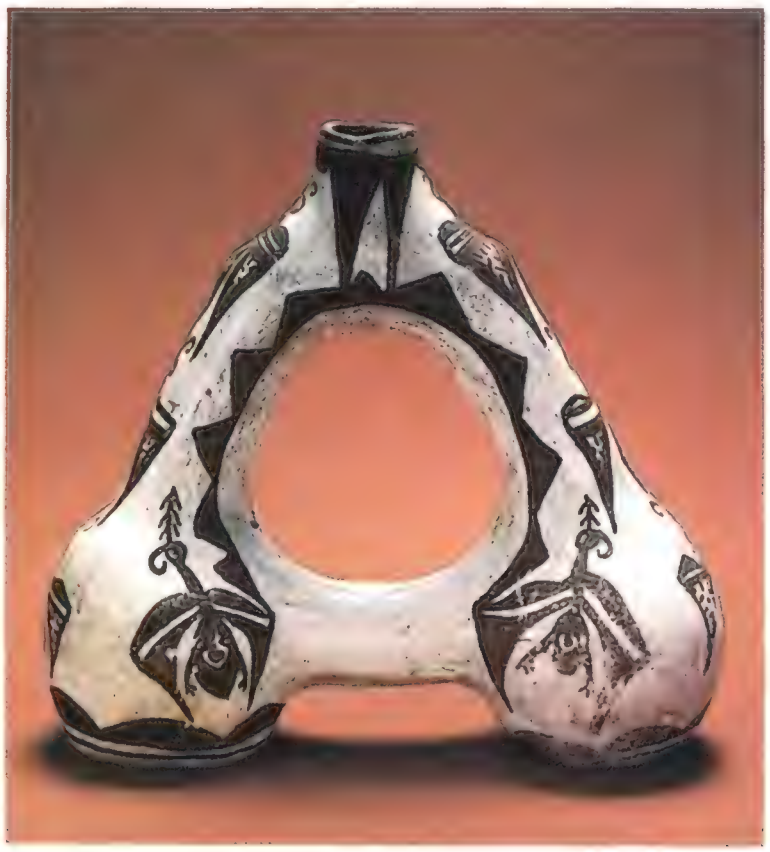
Constance Bond

Orange-slipped hunting canteen has a minimum of decoration.

Duck-shaped version is among the unusual Zuni creations.

Organic curving red designs may represent rattlesnakes.

Typical canteen is globular with a handle at each side.



Triangular canteen is actually two separate ones, joined.

Scroll figures were common on 19th-century Zuni pots.

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Free Travel Newsletter

A benefit for the Smithsonian traveler, armchair or otherwise:

Write to the address at the bottom of this column for a complimentary copy of *Smithsonian Travel News*.

You will learn more about actual trips, the people who take them and the ideas that go into the Smithsonian Travel Program.

You will learn how carefully this program has been created to meet the needs of the very special community, the Smithsonian Associates, to which you belong.

The program is versatile, imaginative, creative, and appeals to every taste and budget.

Domestic Study Tours

New England Seaports September 12-22: Venture back in time to the roots of Yankee heritage and seafaring traditions in Boston, Nantucket and Newport. Tour the grand houses and harbor towns, learn about the whaling industry and old China trade.

Arches/Canyonlands September 21-28: Utah's magnificent red-rock country, land of deserts, canyons and rivers. Travel by trail, jeep and raft with guide.

Maine September 21-30: Come to the Northeast's great outdoors! Discover Maine's unique beauty and spirit. Explore, from the rocky seacoast to the spruce- and fir-clad mountains.

Pueblo Indians and Spanish Villages of New Mexico September 28-October 7: Visit craftsmen, museums and private collections in Santa Fe, Taos and Albuquerque.

California Wine Country October 6-12: Learn to select, enjoy and evaluate California wines. Visit wineries in Napa, Sonoma and Mendocino with wine experts.

Cumberland Island November 9-15: Enjoy the beauty of what was the Carnegie family's Georgia island retreat. Camp on unspoiled beaches, hike in coastal forests.

Everglades December 7-14: A canoeist's dream, a water paradise. For the novice or expert, canoe and camp among the Ten Thousand Islands along the west coast of Florida.

Christmas at the Smithsonian: Celebrate this festive season by spending a weekend at the Smithsonian with behind-the-scenes programs and special dinners in museums. Tour the splendid new National Gallery show, "The Treasure Houses of Britain."

Hawaii January 19-February 1, February 16-March 1: Explore the natural and cultural beauty of the Hawaii most people only dream of. Camp in the unspoiled areas of Oahu, Hawaii, Maui and Lanai.

Baja Whale Watch February 21-March 1: Board the *Royal Polaris* in San Diego for an unforgettable trip down Mexico's Baja peninsula to observe gray whales.

Washington "Anytime" Weekend: Discover your capital city in the Smithsonian style. As a membership benefit enjoy private tours, luxurious accommodations and much, much more. A perfect weekend getaway. Must reserve ten days in advance.

Foreign Study Tours

People's Republic of China, 1985: Two new September departures added! Exclusive tours to a variety of destinations are led by a Sinologist and include intensive pretour briefing.

Rome and Beyond September 6-21: Study the history and architecture of classical Italy. Spend six days in Rome; then go to Florence, Venice or the southern coast.

Oxford/Smithsonian Seminar September 13-28: An exciting program in its seventh year. Study with Oxford faculty, live in an academic setting and see historic villages.

Europe by Train September 18-October 7 or October 9-28: Europe's great trains are not just memories. Luxury, splendid vistas on *Orient Express*, Switzerland's *Glacier Express*, France's swift *TGV*.

Spain September 27-October 12: See the superb art and architecture of Madrid, then move on to serene Catalonia or Andalusia.

Peru September 28-October 13: Immerse yourself in the country's ancient history. Visit Lima, Cuzco, Machu Picchu.

Highlights of Austrian Civilization October 5-20: Enjoy the romance of Salzburg and Vienna; study their cultural heritage.

Adriatic Shores October 6-18: Cruise on the *Argonaut* to Yugoslavia, Italy, Korcula Island, Corfu, Ithaca.

Mediterranean World October 9-23: Take the *Illiria* to the classical centers of Greece, Sicily, Italy, Crete and Carthage.

India by Train October 30-November 15: A Smithsonian premiere! Exclusive use of a maharaja's "Palace on Wheels" to visit the glorious sites and cities throughout the state of Rajasthan.

Egypt and the Nile November 11-30: See bustling Cairo, then cruise the peaceful Nile aboard a chartered riverboat to explore renowned sites—Luxor, Dendera, Abu Simbel.

The Atlantic Crossing December 6-21: A sailing adventure from the Canary Islands to Martinique on the four-masted square-rigger *Sea Cloud*.

Christmas in Europe with the Smithsonian Celebrate with fellow Associates in one of three idyllic settings: Austria, December 21-January 3; Canterbury or Wales, December 22-January 3. Traditional Yuletide celebrations make this a very special holiday season.

Russia Coming in December: Ring in the New Year with a festive holiday gala. Attend the best of Russian theater while visiting historic sites and cities.

Mexico Coming in January: Three exciting archaeological tours.

South America January 15-February 7: A spectacular first for the Smithsonian! Three-week land and sea voyage from Rio de Janeiro, including Iguaçu Falls, Strait of Magellan and Patagonian channels, ending in Santiago.

Blue Whales of Mexico March 9-16: Cruise to the Sea of Cortés aboard the *Don Jose* to explore desert islands and coastlines in search of the mighty blue whale and migratory birds.

Write National Associates, Capital Gallery 455, Smithsonian Institution, Washington, DC 20560 or call (202) 287-3362 for tour brochures

n Washington

Smithsonian Seminars

Expand your educational horizons this fall as you combine a pleasure-filled visit to the nation's capital with stimulating week-long courses of study that highlight Smithsonian museums and research facilities. These purposeful vacation seminars give you the opportunity to share special interests with fellow Associates.

From October 27 through November 1, Smithsonian scholars will lead five exciting new seminars. In addition to a week of intensive study, participants will enjoy specialized field trips, a gala welcoming buffet, evening performances and an elegant farewell dinner. Hotel is optional. The fall 1985 seminars include:

Anthropology Today
Explore the diverse collections and current research at the Museum of Natural History during lectures, field trips, discussions with specialists in physical and cultural anthropology, archaeology and ethnology.

Perspectives on American Art
Curators from the National Museum of American Art will offer illustrated lectures, tours of the museum's exhibition, preparation and conservation areas. Trips to renowned Washington landmarks offer new insights on American art from the 18th century to the present.

Music of the Baroque Era
Enhance your enjoyment of this extraordinary music as you attend a unique program of lectures, demonstrations and performances on historic instruments by the Smithsonian Chamber Players.

Treasures of the Smithsonian: A Writer's View
Learn the techniques of effective writing from Edwards Park, author of *Smithsonian*'s monthly column "Around the Mall and beyond," during stimulating workshop sessions, group discussions and tours of the Institution's most popular exhibitions.

Man's Quest for Wings: Highlights of Aviation History
Curators from the National Air and Space Museum will lead special tours of the museum and its restoration facility during this seminar, which features lectures and films that chronicle America's outstanding achievements in air and space.

or (202) 357-1350 for seminar brochures.

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CHARCOAL MELLOWED DROP BY DROP

By Michael Roddy

Reflections upon our watch-proud times

I didn't know what to expect when I first wore my $2 wristwatch to the office. A little ribbing, perhaps, about how clunky it looked. Or maybe a cutting comment about its origins. I was ready. "Yeah," I'd say, "I got it on the street from a vendor, but it tells time and"—the clincher—"it only cost $2." What I wasn't prepared for was the silence. And those occasional sidelong glances.

We are living in watch-proud times. Even I will admit that at first I had misgivings about a timepiece costing roughly as much as a Big Mac. What does it say about the value you place on time, one of the underpinnings of the modern world, when somehow it is equated with ground beef on a bun? This watch even looks cheap, an affront alike to conspicuous consumption and the craft of watchmaking. On its lusterless face cryptic hieroglyphics indicated it can be taken in a swimming pool at least once, will not break if hit with a fountain pen, and may be worn on an airplane if not mistaken for a terrorist timing device. It is the Styrofoam of wristwatches, a throwaway packaging of time. The late George F. Babbitt wouldn't have been caught dead with it; the Mad Hatter, had he found it in his teacup, would have left it there.

"He's a Rolex man," people are supposed to whisper appreciatively, as if talking about someone with old money. And in some situations, a high-ticket watch is better than a Mercedes because it doesn't leave tire tracks on the floor at Lutèce. We downscale watch owners must steel ourselves against social slights. When the average maître d' gets a glimpse of my sheet-metal special, he reacts as though he's just seen a pair of scuffed loafers.

Most luxury watches cost as much as a fancy German sedan. They either have jewel-encrusted cases, or appear to have come from the control panel of a space shuttle and seem to belong in a museum—or a vault. It takes $10,000 for anything a salesman won't sneer at, and so on up through "the most expensive standard men's" watch at $100,000 to the $5 million Kallista, both of which made the *Guinness Book of World Records*. According to Charles Davidson, a vice president of the North American Watch Corporation in New York, the same fellows who import the likes of Piaget, Concord and Corum: "This generation has more affluency than any before."

But I say "affluency" is how you see it. For the price of a Piaget Polo which, without the decorative jewels, goes for over $11,000, a watch fetishist can acquire 5,500 of my $2 jobs. Talk about affluency. That's a little like having a new watch every year since the pyramids were built. Besides, my $2 timepiece flashes seconds and the date at the push (vigorous) of a button. And it has a built-in light which, for the price, could give costly utility companies a scare.

Besides, the better watches I have owned have all met untimely ends.

My father, a navigator in World War II, gave me my first when I was a child, in the fond hope I'd use it to calculate the average speed of the family car as it lurched to our summer vacation. Before the trip, however, the watch got a bath and thereafter indicated the same time upon departure and arrival.

Years later, in France, I acquired an antiestablishment timepiece, made in a factory whose workers took it over when management threatened a shutdown. The government nationalized the factory, turning my watch into a socialist timepiece. Then *they* shut the plant making the watch a collector's item at least until it was expropriated (i.e., swiped) by some nonrespecter of private property.

There followed a period when time became a matter of public domain. I picked it off the airwaves, from barbershop walls, bank facades and people on the street wearing status watches. I developed a fine sixth sense for time and managed to miss many appointments, dates and trains.

Finally, I gave in and bought a prestigious Swiss watch. I knew it had status because the collection of grave watch repairmen, whom I soon had to resort to, spoke in hushed tones and charged a minimum of $90 just to listen to its insides. It was those gentlemen who drove me into the arms of the $2 street vendor.

Now, despite the occasional sneer, I have the confidence that comes from owning a timepiece outside all parameters of style. Not for me the chagrin of spending $900 for the latest in flossy chronometers, only to have $35 duplicates flood the market. A while back the Cartier people, in league with the U.S. Customs, consigned some 4,000 fake Cartier watches to be publicly crushed to death by bulldozers on TV. Cheap innards, Cartier claimed, but the price of the condemned items had been jacked up to $500 retail.

As for short-term status, author James Charlton has the answer to that. He's just put out a book baldly entitled *Surface Chic* which provides fancy cardboard cutouts of many popular status brands, including the Piaget Polo. This is simply taped over your $2 watch, thus providing yourself a sense of power—and a saving of $10,998.

Even if my $2 watch stops, what have I lost? According to legend, no less a prince of cost-effective precision than the former Secretary of Defense Robert McNamara preferred stopped watches to watches that kept gaining or losing time because, he said, at least twice a day they would be absolutely accurate.

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